



Michael S. Dukakis
Governor

Kentaro Tsutsumi
Chairman

Charles J. Dinezio
Administrator

The Commonwealth of Massachusetts
State Board of Building Regulations and Standards

CODEWORD

JULY, 1988

'NETWORKING' A SOLUTION TO TURF BATTLE PROBLEM

I often hear about turf battles waged by building code officials and fire code officials. Each feels he is the ultimate authority regarding building construction and/or building safety.

Only when these code officials realize that each one has an important and clearly defined role to play in their community's development, can effective cooperation develop.

Probably the hardest thing for most fire code officials to accept is the awesome power delegated to the building official through the BOCA National Building Code. The building official is the person who ultimately approves the certificate of occupancy. The building official has the responsibility of coordinating all aspects of a proposed structure from start to finish.

The power and authority vested in the building official is not a mistake and in fact must be acknowledged if the BOCA National Codes are to be effectively interfaced.

I believe the building official is the code "powerbroker" for many reasons, several of which are:

1. Most communities had a building official long before a fire code official was hired or promoted.
2. The building code addresses fire safety issues in nearly every article.
3. The fire prevention code is, and always has been, a maintenance code.

How, then, can building code officials and fire code officials end turf battles and get on with the business at hand? I propose that "networking" is the answer.

'NETWORKING' - CONTINUED FROM PAGE 1

First - acknowledge and respect the building code officials' power and authority. Second - accept the fact that the fire prevention code is a maintenance code and is no less important than the building code. Third - get to know the fire prevention code, Article 1 specifically, and see how much authority the fire code official has. I believe both codes, building and fire, confer staggering power and authority on the respective code official.

With lines of authority identified and readily acknowledged, begin a "network".

Networking is the ongoing communication between persons in which each party shares common information or interests with the other. It is the sharing of information, materials, and ideas on a continuing basis.

Rapid changes within the building construction field and in the area of fire prevention have placed building departments and fire departments in a position where they are unable to acquire and maintain the quantities of information available in a given field. No building department or fire department, no matter what its size, has the resources to research and accumulate all the data and information needed to deal with every particular issue. To keep abreast of the changes occurring in the various aspects of building construction and fire prevention, networking is a requisite.

Networking is a reciprocal exchange program. It is of value to all involved because everyone shares in each other's research. Today's computer age lends itself to networking. More agencies can be included in the sharing process due to ease of data storage, retrieval, and exchange.

Once you have established open communications with the building official and/or the fire code official, networking can begin. An understanding should be reached that each party has something to offer to the other. The sharing may not always be equal, but it should be ongoing.

Networking is a proven method of promoting building safety. Try to establish continuous rapport with others. Wherever you establish a networking relationship, it can act as a springboard for your programs and ideas and enhance the positive image of all involved. Why not turf sharing instead of turf battles?

Kenneth L. Durham
Fire Marshal
Sterling Heights, Michigan

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RETROFIT SPRINKLER REGULATIONS: 530 CMR 2.00

The Fire Safety Commission established by Chapter 633 of The Acts of 1986 has promulgated regulations, 530 CMR 2.00, Installation of Automatic Sprinklers in High Rise Buildings or Structures, to regulate the installation of automatic sprinkler systems in buildings over seventy feet (70') in height and constructed prior to January 1, 1975.

These regulations, effective May 27, 1988, require (Section 2.03, Implementation) the owner of a building subject to the regulations to submit to the head of the fire department: 1.) a statement of intent, 2.) a schedule, and 3.) a Fire Protection Systems Data Sheet as provided by the Commission for the installation of a complete automatic sprinkler system in compliance with the provisions of M.G.L. c.148, s.26A 1/2. This information must be filed within forty-five (45) days of May 27th (July 11, 1988). Section 2.03.2 requires the head of the fire department to serve notice on the building owner that said building is within the scope of these regulations.

Building officials are urged to coordinate this effort with the head of their local fire department as they have specific responsibilities under these regulations and the State Building Code.

BUILDING OFFICIAL RESPONSIBILITIES UNDER 520 CMR 2.00

Section 2.01, Administration and Enforcement, of 530 CMR 2.00, Installation of Automatic Sprinklers in High Rise Buildings or Structures, defines specific responsibilities of the building official in the enforcement of these regulations, although the overall enforcement authority rests with the head of the fire department. In the most part, the duties placed upon building officials mirror their responsibilities under the State Building Code; however, there are some important differences in the requirements.

A building permit is required (Building Code Section 113.6; Regulation Section 2.01.6) and the Regulations add to the "Application for Permit" requirement that, "The permit application shall contain a general description of any asbestos removal or encapsulation." Building officials may wish to issue a separate permit for asbestos operations to ensure that no required fireresistance ratings are lost. Additionally, the Regulations require a copy of the permit application as well as the plans be forwarded to the head of the fire department.

Another difference in the requirements (Building Code Section 1201.0; Regulation Section 2.01.7) is the Regulation requirement that, "The plans shall contain a certification by a Massachusetts registered professional engineer that the existing structure can support the weight of the sprinkler system and that the method of support of the piping is adequate."

With the exception of these differences, the requirements and procedures of the Code, Section 113.5, Article 4 and Article 12 are to be followed by the building official.

ASK THE APPLICANT

We have received several letters from building officials in response to the May issue of CODEWORD, particularly the "Codeword" article, Matters Not Covered. Their very legitimate concerns are; "How can a building official properly function without the time to perform the research into reference standards that is required, and how can this research be done without a large library of those reference standards?"

The answer to these questions is, "Ask the applicant," and the mechanism for asking the applicant lies in Section 113.0, Application for Permit. Various provisions of this section require and empower the building official to demand of the applicant full specification of the work to be performed such that he/she is, "...satisfied that the proposed work conforms to the requirements of this code..." (Section 114.1). Section 113.7, Engineering details, specifically provides that the building official may require, "...adequate details... and other essential technical data...prepared by a registered professional engineer." Essential technical data certainly includes the specification of the appropriate reference standards.

Building officials are not expected to research reference standards for applicants; they are expected to require this research when it is necessary to demonstrate conformance.

ENERGY CODE

At its meeting of June 28th, the State Board of Building Regulations and Standards re-affirmed the effective date of the new energy code, Article 20 and Sections of Article 21, to be July 1, 1988. It was also voted that the use of the "old" energy code (Article 20 and Sections of Article 21 of the Fourth Edition, September 1980) is also to be allowed until September 30, 1988.

During this period, either set of energy provisions may be used, however, once the set of provisions (old or new) has been specified it must be completely followed, i.e. the provisions of the old and the new may not be "mixed". Structures for which permits will be issued after September 30, 1988 must comply with the new energy code.

CODEWORD

This issue's CODEWORD is: Noncombustible, and will include a brief history of the term as it is used in building codes and a short description of the test method used to determine "noncombustibility".¹

Originally (1920), the term "incombustible" had the dictionary-like definition, "materials...that will not ignite or burn when subjected to fire." By 1943, the National Building Code of the National Board of Fire Underwriters had redefined incombustible construction as, "...assemblies which do not involve materials of such kind or quantity or so contained as to burn during exposure in a test fire on continue flaming or ignite after the furnace is shut off." This definition first introduced into building codes the concept of a "test standard(s)" for incombustibility. In 1949 the term was changed to "noncombustible" and the BOCA Basic Building Code (1950) included type of furnace, furnace temperature and duration of exposure in its definition. The test standard(s) have continuously developed since that time, becoming increasingly specific as to the test methods, equipment and procedure.

Section 903.5.1.1 references the test procedure for defining noncombustibility as ASTM E136-73, Method of Test for Determining Noncombustibility of Elementary Materials. This test procedure specifies a test apparatus of a vertical tube furnace pre-heated to a temperature of 1382 degrees F. (750° C), a temperature representative of levels known to exist during building fires. A specimen (1 1/2 x 1 1/2 x 2 inches) is placed in the furnace and, "...shall be reported as noncombustible if..." several criteria are met. The Code requires that the exposure of the specimen does not cause a fifty-four (54) degree F. rise above furnace air temperature and that the specimen not flame after an exposure of thirty (30) seconds. These two criteria were chosen after a series of tests on a wide variety of materials as ones which distinguish between clearly combustible and clearly noncombustible materials. (The test standards also include; weight loss, thermocouple characteristics and repetitive testing criteria.)

¹ Abstracted from The American Society for Testing and Materials (ASTM), Standard Designation: E 136-82, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C.

NONCOMBUSTIBLE - CONTINUED FROM PAGE 5

ASTM describes a limitation of the test as, "...not provid(ing) a quantitative measure of heat generation or 'combustibility;' it simply serves as a method with selected (end point) measures of limited combustibility." As to the "Significance and Use" of the test, ASTM states, "While actual building fire exposure conditions are not duplicated, this test method will assist in indicating those materials which do not act to aid combustion or add appreciable heat to an ambient fire."

Materials "passing" this test are considered noncombustible and acceptable for use in Types 1, 2 and 3 construction (Section 903.5.1) when used in assemblies providing the fireresistance ratings specified in Table 214. These fireresistance ratings are determined by the appropriate test of the assembly (ASTM E 119).

FIRERESISTANCE RATING TEST - ASTM E 119

The Code (Appendix G) references the ASTM E 119-76, Methods of Fire Test of Building Construction and Materials as the test method for determining fireresistance properties. This extremely simplified description of the ASTM E-119 test is meant only to distinguish it from the E136 test for "Noncombustibility".

The assembly tested is "full size" and tested under appropriate loading conditions. The test furnace consists of a furnace room in which fire conditions are controlled to follow a standard time/temperature curve. Increases in temperature at defined intervals simulate the fire conditions of a fully involved room. The severe exposure conditions provide a relative measurement of the performance of assemblies which are classified in maximum hourly ratings. The fireresistance ratings in hours required by Table 214 are the assembly ratings provided by this test.

There are three conditions of acceptance (failure conditions) required for the assignment of an hourly rating: 1.) the assembly sustains the load without passage of flame or gasses hot enough to ignite cotton waste, 2.) the assembly withstands a hose stream test, and 3.) the transmission of heat through the assembly (wall or partition) during the test does not raise the temperature on its unexposed surface more than 250° F (139° C) above its initial temperature.

RECENT STATE BUILDING CODE APPEALS BOARD DECISIONS

Section 126.7.11 (Contents of Decision) of the Code states, "Any decision shall not be considered by any person or agency as a precedent for future decisions."

APPEAL DOCKET #87-35

The District State Building Inspector was conducting an inspection in an existing office building which had been converted from a rooming house. The owner had been issued a Certificate of Use and Occupancy. The State Inspector was there to certify the building for an occupancy licensed by the Department of Mental Health. In the course of his inspection, he cited violations of Section 437, an unsuppressed open well, and Section 609, lack of independent egress.

The Appellant testified that in the renovation of the existing building, many fire safety improvements had been made, including enclosure of stairways, fixed safety glass in one hour walls overlooking the open well, a smoke evacuation system and a smoke detection system. The appellant argued that a city ban on water connections prevented the installation of a suppression system, and that existing fire walls dictated the placement of the egresses.

The Board determined that in the renovation of the structure an existing open stairway was converted into an open well as an "architectural feature". This conversion had the effect of creating a new system(s) (of egress, ventilation and smoke control) and the provisions of Section 2203.3 must be applied. The Board denied the requested relief and ordered the revocation of the Certificate of Use and Occupancy until such time as the cited violations had been corrected.

APPEAL DOCKET #87-82

The building official refused to issue a building permit for the renovation of the basement in a building of 3C construction type. This "multi-use" space, previously used as a licensed day care center, use group A-4, was to be converted for use as a day care center for children under two years and nine months of age, use group I-2.

The building official cited Section 434.1 which requires that the provisions of Section 434.0 shall apply to new and existing day care centers. In an I-2 use group, the existing day care center which conformed to the requirements of the A-4 use group, would violate Section 434.4.1, as it exceeds 2,400 square feet, and Section 434.5.1.1.2, as egress stairs are more than 4 feet in height, and do not lead directly to grade.

The Board considered the proposal of the applicant to reduce the area with a non-permanent divider, and the appellant's request that window egress provide the basis for a variance of the stair height requirement. The Board voted to deny the requested relief and confirm the building official's refusal of the permit.

PROPOSED LEGISLATION STATUS REPORT

We thought you would be interested in the status of two bills which directly affect building officials.

First, House 5268 (dealing with the term of office of local building officials): The reporting period for the Committee of Public Service was extended to September 30, 1988. The bill, therefore, is still "alive" until the end of the calendar year.

Second, House 5486 (dealing with the qualification/certification of building officials at the local option of municipalities with a population of 70,000 or greater): This bill was rejected by the General Court and is, therefore, "dead" unless refiled next year.

LOCAL INSPECTION OF MANUFACTURED BUILDINGS

The Rules and Regulations for Manufactured Buildings (Appendix Q) regulates in Section 5 local enforcement agency procedures and inspections. While all required inspections of the building itself are performed by Third Party Inspection Agencies in the factory, local inspection of site preparation, service connections and, of course, any site built components (decks, stairs, etc.) is required.

In particular, Section 5.3, Compliance with Instructions, directs appropriate local inspection to determine that all installation instructions have been observed. "This may include tests for tightness of plumbing and mechanical systems, and for malfunctions in the electrical system and visual inspection for obvious nonconformity with the approved building system."

Building officials are requested to ensure that their plumbing and wiring inspectors perform inspection/tests for tightness of plumbing and malfunctions in the electrical system. As disassembly is prohibited (Section 5.3.1), local inspectors should perform these inspections within the guidelines of the regulations, and if violations are found or suspected, they must report these in writing to the Department of Public Safety (Section 5.6).

OVERVIEW OF AMENDMENTS TO THE STATE BUILDING CODE

Enclosed with this copy of CODEWORD you will find a two page "handout" which briefly summarizes the code changes that became effective July 1, 1988. As stated in the handout, it is not intended to substitute for detailed study of the changes, but is meant only to familiarize code users with areas of change. Please feel free to copy and distribute this "overview" to the design and construction community in your city/town.



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*McCormack State Office Building
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Boston, Massachusetts 02108*

(617) 727-3200

OVERVIEW OF AMENDMENTS TO THE STATE BUILDING CODE

On July 1, 1988, the most comprehensive set of code changes filed by the State Board of Building Regulations and Standards became effective. The changes constitute over 320 replacement code pages to be inserted into the fourth edition of the State Building Code, and represent work done by the Board, its staff, and many of its standing advisory committees over the past three years.

The replacement code pages will be made available to local building officials at their monthly district meeting with their District State Inspector. At that meeting the State Inspector will provide an overview of the changes. Replacement code pages may also be picked up by local building officials at the District Offices of the Department of Public Safety.

The updated pages are available to the general public through the State Bookstore, Room 116, State House, Boston, MA 02133-telephone (617) 727-2834, at a cost of \$4.00 per set.

We have prepared this overview in order to make code users more aware of some of the more significant code changes. It is not our intent to attempt to address all of the items changed in the code, nor should this overview be substituted for detailed study of the amendments. However, it is hoped that these highlights will provide a good familiarization with the changes and will serve as an introduction to areas meriting more careful examination to persons involved in all aspects of building construction and design.

REVISED ENERGY CODE

The single most significant part of this set of code changes is the inclusion of a new energy code for Massachusetts. These new provisions have resulted from a co-operative effort between the Board and the Executive Office of Energy Resources, which funded the Board's research and development of these provisions. An Energy Code Advisory Committee was formed, with a participating membership of over fifty experts, including representatives of architects, engineers, designers, contractors, utilities, manufacturers, inspectors, lawyers, academia, community groups, conservationists, and various branches and levels of government. Their assistance to the Board in the development of the new energy regulations was invaluable.

The changes include a totally revised Article 20, over thirty new and revised definitions to be used with the energy code, minor changes to Articles 10 and 21, the addition of new code Appendices, L and V containing energy calculation data, and the updating of standards information in Appendices A, B and C of the Code. Also included in the new energy provisions are two optional computer-based procedures which may be used to calculate building envelope and lighting system compliance for certain buildings. The computer-based calculation procedures are designed to run on IBM-PC compatible equipment, and are contained on two diskettes. The two diskettes along with printed information which explains and documents the procedures are available for purchase from the State Bookstore at a cost of \$5.00 per set. To our knowledge, ours is the first code to incorporate such a computerized code option, and we are proud to be the first jurisdiction to utilize this new technology to promote good building design and code compliance.

ENERGY CODE "GRACE PERIOD"

In order to allow more time for designers and other code users to implement the new energy provisions, the Board of Building Regulations and Standards has voted to allow a three month grace period. That is, for the months of July, August and September, 1988, the option of complying either with the "old" energy code or the "new" energy code in its entirety is allowed.

RESIDENTIAL ENERGY PROVISIONS

Some other aspects of the new energy provisions are also innovative. For the first time, residential insulation requirements now impose higher requirements for walls and windows when electric resistance heating is used. The new provisions also have increased the roof-ceiling R-value from 20 to 30, and set new R-values of 20 for floors over unconditioned space, 10 for all slabs on grade, and 7 for doors enclosing conditioned space.

COMMERCIAL ENERGY PROVISIONS

On the commercial side, the changes are even greater in scope. New provisions are based upon the latest work of the American Society for Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Building envelope compliance is determined either from a series of alternate component package (ACP) tables, or using the computerized calculation mentioned earlier. In either case, the path to code compliance will consider the effectiveness of the insulation in concert with other energy usage parameters such as the type and configuration of windows, lighting power usage and the building's thermal mass. There has also been a significant increase in energy efficiency requirements for HVAC equipment, and lighting power budgets have been tightened. The expected result is commercial construction which is significantly more energy efficient. However, by promoting good design and providing a great degree of flexibility, these provisions are not expected to materially increase construction costs, according to a study performed by ASHRAE.

STRUCTURAL LOADS

In Article 7, our Loads Advisory Committee sponsored amendments to several sections after a review of provisions of the 1984 BOCA Code and several other engineering studies. Some of the changes included revision of provisions for impact loads, concentrated loads and some other special loads (such as handrail and guardrail design loads). In addition, drifting snow loads were increased in several cases, reflecting the latest engineering knowledge in this area. A change was also approved to Section 429 which allows elimination of curbs or guardrails in open parking structures so long as the walls are designed to resist impact from vehicles.

GEOTECHNICAL PROVISIONS

The Geotechnical Advisory Committee also sponsored several changes, including revisions to Table 720 (Allowable Bearing Pressures for Foundation Materials) and inclusion of a new Appendix X containing background information for classification of foundation materials. Another change of note sponsored by the Committee modifies pile load test requirements.

CONGREGATE DWELLING UNITS

The Board also added a definition for Congregate Dwelling Units. This definition, proposed by the Executive Office of Communities and Development, sets use group classifications for government-sponsored shared housing for senior citizens. Depending upon the amount of shared facilities, Congregate Dwelling Units may be classified as use group R-2, R-3 or R-4.

COMMERCIAL ENERGY PROVISIONS
FLOOD PLAINS

Design requirements for construction in floodplains (Section 744) were modified so as to comply with the latest federal requirements. This change, proposed by our State Department of Water Resources in conjunction with the Federal Emergency Management Agency, will help to maintain our state's eligibility for federal flood insurance programs mentioned earlier. In either case, the path to code compliance will consider the effectiveness of the insulation in concert with other energy usage parameters such as the type and configuration of **MECHANICAL SYSTEMS AND OPEN WELLS** the building's thermal mass. There has also been a significant increase in energy efficiency. Several changes were enacted by the Board on the advice of its Mechanical Systems Advisory Committee. Perhaps the most significant of these changes was the adoption of the 1987 BOCA National Mechanical Code as our new mechanical reference standard, replacing the 1978 BOCA Mechanical Code. Other significant changes include the deletion of the "pressurized stairwell option" for high rise construction and revision of covered mall smoke control requirements to clarify that the smoke evacuation system must be capable of manual activation by the fire service, but need not be activated by manual fire alarms. Also enacted at the Committee's suggestion were several changes to Section 437 (Open Wells). One of the amendments more clearly defined atriums and floor openings according to permitted uses for each type of open well. Other significant changes restricted the usage of atrium spaces for providing exitway access and changed the rate of smoke exhaust required for small atriums, concentrated loads and some other special loads (such as handrail and guardrail design loads). In addition, drifting snow loads were increased in several cases. **STAFFED APARTMENT PROGRAMS** engineering knowledge in this area. A change was also approved to Section 429 which allows elimination of research data provided by that office, the Board enacted a new Section 440, Group Dwelling Units, which is applicable to new and existing staffed apartment programs operated by the Department of Mental Retardation and the Department of Mental Health. **GET THE CH** section provides a matrix of compliance options for group dwelling units depending on the capability for self-preservation of unit residents and the physical characteristics of the building housing the group dwelling unit. **REVISIONS TO TABLE 720** sponsored several changes, including revisions to Table 720 (Allowable Bearing Pressures for Foundation Materials) and inclusion of a new **STEEL STANDARDS UPDATED** background information for classification of foundation materials. Another change of note sponsored by **CHANGES TO MANY STEEL CONSTRUCTION STANDARDS** contained in Appendix B of the code were enacted, at the request of the American Iron and Steel Institute. These amendments updated standards for construction using structural steel to the latest nationally recognized standards of the industry.

The Board also added a **CLASSROOM EXITS** Congregate Dwelling Units. This definition, proposed by the Executive Office of Communities and Development, at the request of the University of Massachusetts, on special classroom exit provisions were modified (Section 612) so as to apply only to those classrooms to be used only by children under the age of twelve, as it was felt that application of these standards was necessary only to provide additional safety for young children.



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The changes include a totally revised Article 20, over thirty new and revised definitions to be used with the energy code, minor changes to Articles 10 and 21, the addition of new code Appendices, L and V containing energy calculation data, and the updating of standards information in Appendices A, B and C of the Code. Also included in the new energy provisions are two optional computer-based procedures which may be used to calculate building envelope and lighting system compliance for certain buildings. The computer-based calculation procedures are designed to run on IBM-PC compatible equipment, and are contained on two diskettes. The two diskettes along with printed information which explains and documents the procedures are available for purchase from the State Bookstore at a cost of \$5.00 per set. To our knowledge, ours is the first code to incorporate such a computerized code option, and we are proud to be the first jurisdiction to utilize this new technology to promote good building design and code compliance.

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CONGREGATE DWELLING UNITS

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MECHANICAL SYSTEMS AND OPEN WELLS

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STAFFED APARTMENT PROGRAMS

After discussion with the Executive Office of Human Services and consideration of research data provided by that office, the Board enacted a new Section 440, Group Dwelling Units, which is applicable to new and existing staffed apartment programs operated by the Department of Mental Retardation and the Department of Mental Health. The section provides a matrix of compliance options for group dwelling units depending on the capability for self-preservation of unit residents and the physical characteristics of the building housing the group dwelling unit.

STEEL STANDARDS UPDATED

Changes to many steel construction standards contained in Appendix B of the code were enacted, at the request of the American Iron and Steel Institute. These amendments updated standards for construction using structural steel to the latest nationally recognized standards of the industry.

CLASSROOM EXITS

At the request of the University of Massachusetts, special classroom exit provisions were modified (Section 612) so as to apply only to those classrooms to be used by children under the age of twelve, as it was felt that application of these standards was necessary only to provide additional safety for young children.