



CODEWORD.

THE OFFICIAL NEWSLETTER OF THE BOARD OF BUILDING REGULATIONS & STANDARDS

~October 2001~

Kentaro Tsutsumi, P.E.
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James Jajuga
Secretary

Jane Swift
Governor

Thomas L. Rogers
Administrator

OBITUARY- DANIEL O'SULLIVAN



The Board of Building Regulations & Standards is saddened to announce the death of Vice Chairman Daniel P. O'Sullivan.

Dan passed away on Thursday July 26th at the age of 56. In addition to being Vice Chairman of the BBR&S, a member of the Appeals Board and of the Building Official Certification Committee, Dan was also the City of Springfield Building Commissioner for the past 29 years.

Dan served in the 25th Army Infantry in Vietnam and was awarded the Vietnam Campaign and Service medals, National Defense Service Medal and an Army Commendation Medal.

Dan was a consummate professional and will be dearly missed by the Board and its staff.

The BBR&S and its staff offer their condolences and sympathy to Dan's family.

NEW CERTIFICATION COMMITTEE MEMBERS

We are pleased to announce the appointments of two new members to the Building Code Enforcement Official - Certification Committee.

Christopher Clemente is a full-time, local inspector in the Town of Andover. Previously, Chris was employed as a local inspector in the Town of Billerica and the City of Boston. Chris began his career in building inspection in 1993. In 1994, Chris passed all examinations required to become certified as a Local Inspector, and by 1998 he had completed all examinations required to become certified as an Inspector of Buildings/Building Commissioner. Chris holds

a Bachelor of Science degree in Industrial Science/Construction Management and an unrestricted construction supervisor's license.

Erik Wight is employed by the Town of Sunderland as a part-time building code enforcement official and works full-time as an inspector of buildings for the Town of Deerfield. After completing all requisite examinations, Erik received certification as a Local Inspector in 1997, and as an Inspector of Buildings/Building Commissioner in 1998. Erik brings twenty years of experience in building construction, home inspection, and project management to his position of building code enforcement official. In total, Erik has earned 9 certifications through the National Certification Program for Construction Code Inspectors (NCPCCI). He is also a licensed construction supervisor and registered home improvement contractor in the Commonwealth.

Chris and Erik were selected from a pool of over thirty candidates who applied for the vacant committee seats. Each brings a unique and welcomed perspective to the Committee.

We wish to extend congratulations and a warm welcome to both Chris and Erik, and we also wish to thank each candidate who applied for consideration.

SPEAKING OF CERTIFICATION

All building code enforcement official certification exams are back on-line as of July of this year. Please remember that the new examinations are based on the International Code Council's (ICC) International code series, 2000. Information regarding exam criterion may be obtained by calling our Taunton Office @ (617) 727-5190, extension 560. A certified inspector may check

his/her continuing education credit by dialing this number as well.

THE ENERGY CORNER

BBRS TO OFFER REFRESHER TRAINING ON RESIDENTIAL ENERGY CODE

When the energy code for low-rise residential buildings (Appendix J) took effect in 1998, BBRs delivered training to 7500 builders, code officials, architects and others involved in the one- and two-family construction industry. Since then a few things have changed, and BBRs is reaching out again to offer seminars on Appendix J. Beginning in Fall 2001, and into 2002, the updated sessions will benefit those who missed the first round of training, and also serve as a refresher to those who did attend. The new sessions will include:

- Updates to Appendix J (including an easy approach to additions)
- Tips on avoiding common problems in meeting the code
- Introduction to a new release of MECcheck compliance software with easy-to-use time saving features (attendees will receive a free CD)
- An opportunity to ask questions on the energy provisions

As in 1998-99, BBRs will team up with local building officials, materials suppliers, and homebuilder associations to deliver this training throughout the state. The training is offered at no charge. Interested sponsors should contact David Weltz at 617-727-3200, x25252, or via e-mail at david.weltz@state.ma.us.

INTRODUCING MECCHECK RESIDENTIAL SOFTWARE

There is a new version of compliance software to support Appendix J. It is MECcheck for Massachusetts. The software has a new name, a new look and some new features that make it easier to use, but it gives the same results as the older MAScheck. Because the algorithms used in both programs are the same, builders and architects can continue using either one. The software is available for free on line at the [Energy website](http://www.state.ma.us/bbrs/energy.htm). (www.state.ma.us/bbrs/energy.htm)

CONFERENCE SCHOLARSHIPS AVAILABLE FOR BUILDING OFFICIALS

An upcoming conference in Sturbridge, MA will focus on "Home Performance Strategies for New England." The Nov. 19-20 event brings together some of the region's top names in building science to discuss durability, health and safety, comfort, and energy efficiency. A limited number of scholarships, provided by the ENERGY STAR Homes program, are available for Massachusetts building officials. Those interested should call Jean Adie at 800-628-8413, x3368.

POST TENSIONED AND PRE-STRESSED CONCRETE BEAMS

This article presents a rudimentary overview of the basic principles involved in pre-stressed or post tensioned concrete. The design of pre-stressed or post tensioned concrete beams is a complex issue and is beyond the scope of this article.

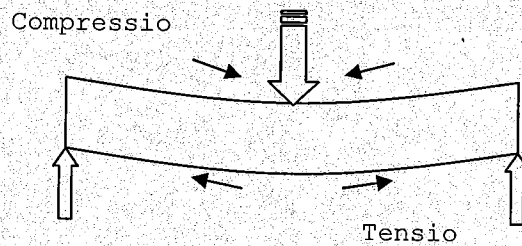
An important engineering property of concrete is its strength in compression. In contrast concrete is weak in tension, its tensile strength approximating to only 10 per cent or less of its compressive strength. The tensile strength of concrete therefore is largely ignored in conventional design. Pre-stressing or post tensioning maximizes the effectiveness of concrete by utilizing its best engineering property - its compressive strength.

Under normal gravity loading a concrete beam will deflect in the direction of the applied (gravity) loads as the beam resists the load. The deflected shape will be in the form of an arc of a circle. The upper portion of the beam is on the inside radius resulting in compression of the upper portion of the beam cross-section and tension in the lower portion of the beam. In order to resist the tensile forces in the lower portion of the beam, conventional concrete beams are reinforced with steel bars which provide the necessary tensile strength considered absent in the concrete itself (fig. 1 page 3).

In pre-stressed concrete members, steel cables or wires are placed near the bottom of the beam and a tensile force is added by mechanically "stretching" the cables or wires with hydraulic or mechanical jacks. The concrete beam is then cast and after curing the cables or wires are released. The wires will then tend to shorten and transfer the load

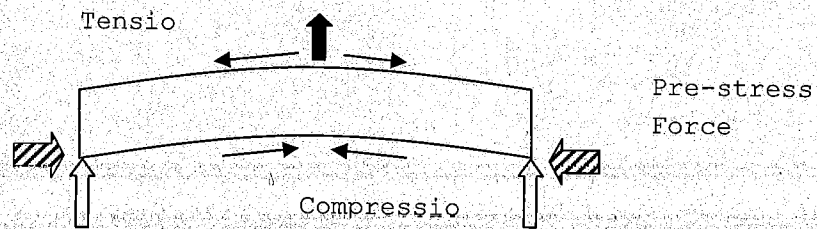
into the concrete beam placing the entire section (or a portion of it) in compression. The effect, as far as the beam is concerned, is the same as adding an upward load. The concrete thus has "built-in" compression. The amount of compression is selected by the structural engineer based on the load carrying characteristics required of the beam. The general objective of the final design is to "balance" this force such that when the live load is applied to the beam there is little or no tension in the lower portion of the beam thereby utilizing the strength of the concrete, which is its ability to resist compressive forces. (See figures 2 & 3 on page 3).

BASIC PRINCIPLES OF PRE-STRESSED AND POST TENSIONED CONCRETE



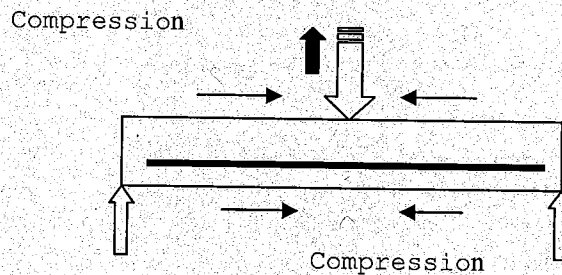
Loaded beam
Figure 1

+



Pre-stressed beam
Figure 2

=



Net Effect Pre-Stress + Load

CONSTRUCTION SUPERVISOR DISCIPLINARY ACTIONS

Licensee	CSL #	Disciplinary Action Taken
Glen Field	59267	License Suspended effective June 19, 2001, must take and pass construction supervisor license examination. Must see the Board Administrator prior to reinstatement.
Kris LeGrand	35948	Letter of Reprimand issued effective June 19, 2001.
Woodrow Witter	34246	Letter of Warning issued effective June 19, 2001. Warning also applies to a second complaint currently on file with the BBRs. Any future complaints will result in further disciplinary action before the License Review Committee.
Arthur Muller	66722	License Suspended effective June 19, 2001, must take and pass construction supervisor license examination. Must see the Board Administrator prior to reinstatement.

SECRETARY PERLOV RESIGNS

SENATOR JAJUGA APPOINTED SECRETARY
Secretary of Public Safety Jane Perlov resigned on August 8, 2001 and has accepted the position of Chief of Police in Raleigh, North Carolina. Governor Jane Swift has appointed Senator James Jajuga as Secretary of Public Safety. The BBRs and Staff wish all future success to Secretary Perlov and extend a warm welcome to Secretary Jajuga.

Exception: The vapor barrier may be omitted:

1. From detached garages, utility buildings and other unheated accessory structures;
2. From driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date;
3. Where approved by the building official, based on local site conditions."

WELCOME BBRs GENERAL COUNSEL - STEVE OSGOOD

The BBRs is pleased to announce the appointment of Steven P. Osgood, Esq. as legal counsel. Attorney Osgood also serves as General Counsel for the Department of Public Safety. Attorney Osgood was formerly employed by both the Bureau of Special Investigations and Department of Revenue. Attorney Osgood will be responsible for the BBRs legal affairs. Welcome Steve.

Since the Sixth Edition of the Massachusetts State Building Code is based on the 1993 BOCA National Building Code and as section 1905.1 reads the same as section 3605.2.3, the BOCA Code Commentary regarding Section 1905.1 can prove useful in understanding the intent of both section 1905.1. and 3605.2.3. The commentary, in part, reads as follows:

"An approved 6-mil vapor retarder placed between the concrete slab and the supporting ground is required for all habitable and/or heated spaces to prevent the migration of water vapor through the slab. The listed exceptions acknowledge conditions where the migration of limited moisture through the slab will not adversely affect the occupancy of the structure. Vapor retarders, while preventing moisture from migrating through the slab from below, can adversely affect the construction and performance of concrete slabs on grade. Finishing operations may be delayed since it will normally take longer for the bleed water to evaporate from the surface. Additionally, the tendency for concrete to develop plastic shrinkage cracking and drying shrinkage

VAPOR BARRIERS AND CONCRETE SLABS-ON-GRADE

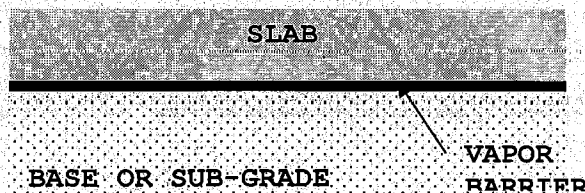
A question often received by the BBRs staff is "Does the code require a vapor barrier beneath concrete slabs on grade for one and two family dwellings?"

This topic is regulated by section 3605.5.2.3 of the Code, which states:

"An approved vapor barrier with joints lapped not less than six inches (153 mm) shall be placed between the concrete floor slab and the base course or the prepared sub-grade where no base course exists.

cracking may be exacerbated. Another problem that occurs is the tendency for the slab to curl or warp upward at the edges. This is because the top portion of the slab is drier than the bottom, causing the curling effect³. If the vapor retarder is necessary, one solution to the above problems is to place a 2- or 3-inch layer of sand on top of the vapor retarder prior to concrete placement. The sand will absorb some of the excess water from the concrete and allow earlier finishing. This will lessen the other adverse effects. If the layer of sand is used, it is to be compacted by wetting it the day before the concrete is to be placed. However, if the sand is to function effectively as a 'blotter', it must be free of drainable water at the time of concrete placement."

The American Concrete Institute (ACI) Manual of Concrete Practice ACI 302.1R-89 titled: "GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION" also provides guidance regarding vapor retarders and this guidance is echoed by the 1993 BOCA commentary language.



PERFORMANCE AND PRESCRIPTIVE CODE PROVISIONS

by

Eugene M. Novak, Jr. District State Building Inspector DPS, Boston
and

Brian Gore, PE., Technical Director, BBRB
Current building codes employ a mix of both "prescriptive" and "performance" based provisions. An example of a prescriptive provision is:

A minimum of 2 exits are required from every floor or space with an occupant load up to 500 persons.

An example of the same provision as a performance standards may be:

Sufficient means of egress are required such that all intended occupants are able to safely

evacuate the floor or portion of a floor in the event of an emergency situation occurring anywhere in the building which may adversely affect the occupants of the floor or space.

The "prescriptive" option leaves no alternative to the designer of the building in terms of exit design whereas the "performance" based solution is developed by the designer who would be required to evaluate any number of possible emergency scenarios commensurate with the occupancy of the building; evaluate the effects of the emergency on the space in question; estimate (or model) the reactions of the occupants and; design an exit system which would ensure that the occupants could safely exit under the design scenarios.

The resulting design could include a mix of fire rated assemblies, alarm and notification devices and sprinklers and other life safety related constructions and may also require the designer use computer models which attempt to predict a fire, the rate of release and spread of heat and products of combustion and the effects of the fire or other emergency relative to persons exiting the building. Perhaps the most difficult prediction is the behavior of the occupants themselves. Will all of the occupants hear an alarm? Will all occupants react to the alarm in the same manner? Will some people ignore the alarm? What is the ambulatory speed of the occupants? Will the occupants panic? The best available fire prediction computer models must take these (and other) factors into account when embarking on a performance-based approach to life safety system design.

Although new to the 2000 International Building Code, performance based design has been incorporated into the Massachusetts State Building Code since the advent of the sixth edition in 1997. Section 903.2.1 permits the designer to use a performance-based option. This option has been used successfully in the design of the Boston Convention Center (see Codeword April 2000 "New Boston Convention Center Granted Building Code Variances").

In actuality life safety performance based design is a relative newcomer to codes. On the other hand, structural provisions for instance have almost always been performance based. For example a building must be able to safely support a live load prescribed by

the code but the code does not provide beam or column sizes but the designer, using well-established engineering analysis tools and knowing properties and strengths of materials will size a structural member so that it will "perform" under the code required loading.

CENTRAL SPRINKLER COMPANY ANNOUNCES VOLUNTARY RECALL OF "O"-RING SPRINKLER HEADS

The following is notice from the Consumer product safety Commission relative to the recall of sprinkler heads.

Office of Information and Public Affairs

Washington, DC 20201

FOR IMMEDIATE RELEASE

July 19, 2001

Release # 01-201

CONTACT: Notice Packet Request Hotline: (800) 871-3492

CPSC CONTACT: Ken Giles

(301) 504-0580 Ext. 1184

Central Media Hotline: (866) 836-3929

"CPSC, Central Sprinkler Company Announce Voluntary Recall To Replace O-Ring Fire Sprinklers WASHINGTON, D.C.- The U.S. Consumer Product Safety Commission (CPSC), and Central Sprinkler Company, an affiliate of Tyco Fire Products LP, of Lansdale, Pa., are announcing a voluntary replacement program. The company will provide free parts and labor to replace 35 million Central fire sprinklers with O-ring seals. The program also includes a limited number of O-ring models sold by Gem Sprinkler Company and Star Sprinkler, Inc. totaling about 167,000 sprinkler heads.

Central initiated this action because it discovered the performance of these O-ring sprinklers can degrade over time. These sprinkler heads can corrode or minerals, salts and other contaminants in water can affect the rubber O-ring seals. These factors could cause the sprinkler heads not to activate in a fire. Central is providing newer fire sprinklers that do not use O-ring seals, and is voluntarily launching this program to provide enhanced protection to its sprinkler customers. This is the third largest replacement program in CPSC history.

Central will provide free of charge replacement sprinkler heads and the labor needed to replace the sprinklers. Central will arrange for the installation by using either its own Central Field Service crews or by contracting with professional sprinkler contractors.

This replacement program includes two kinds of sprinklers, "wet" and "dry." "Wet" sprinklers are installed in piping that is filled with water. "Dry" sprinklers are used in areas that may be exposed to very cold temperatures and the exposed piping does not contain water. Central has received 4 reports of "wet" sprinklers failing to activate during a fire and 9 similar reports on "dry" sprinklers. These incidents resulted in two property damage claims against Central.

The sprinklers were installed nationwide in a wide variety of buildings, including houses, apartments, hospitals, day care facilities, schools, dormitories, nursing homes, supermarkets, parking garages, warehouses, and office buildings.

Central manufactured 33 million "wet" sprinklers with O-rings from 1989 until 2000 that are covered by this program. Central also manufactured 2 million "dry" sprinklers with O-rings from the mid-1970's to June 2001 that are covered by this program. The program also covers 167,000 sprinklers with O-rings manufactured by Gem Sprinkler Co. and Star Sprinkler Inc. from 1995 to 2001. A listing of all the models covered under this voluntary replacement program is attached to the end of this release.

The fire sprinkler heads have the words "CENTRAL" or "STAR", the letters "CSC", the letter "G" in triangle, or a star-shaped symbol stamped on either the metal sprinkler frame or on the deflector.

The model designation and date may also be stamped on the frame or deflector. The deflector is the flower, or gear-shaped metal piece at one end of the sprinkler head.

Laboratory testing has indicated that most of the heads would operate in a fire situation, but certain tested heads required higher water pressure to activate than may be available in particular buildings. Due to the number of sprinklers involved, this program will be phased in, with priority based on the age of the sprinklers, the population affected (e.g., buildings such as nursing homes and hospitals will be given priority), and whether the sprinklers show signs of corrosion or leakage. This program puts in place an orderly process that serves the public interest.

Building and home-owners should check their fire sprinklers immediately to see if they are part of this voluntary replacement program. For more information on how to identify sprinklers subject to this program and to learn how to participate in this program, call the Notice Packet Request Line at 1-800-871-3492 24 hours a day, 7 days a week or access the program's web site at www.SprinklerReplacement.com.

AFFECTED MODELS CENTRAL "WET" SPRINKLERS (Manufactured from 1989-2000)					
GB	GB4-FR	GB-R1	BB2	ELOC	ELO-GB QR
GB-J	GB4-EC	GB-R6	BB3	ESLO	LD
GB-I	GB4-QREC	GB-R	SD1	ELO SW-20	KIT-231
GB-ALPHA	GB-20	ROC	SD2	ELO SW-24	Ultra KIT
GB4	GB-20 QR	BB1 17/32	SD3	ESLO-20 GB	ELO-16 GB
GB-QR	GB-LO	BB2 17/32	HIP	ELO-231 GB	GB MULTI-LEVEL
GBR-2	LF	BB3 17/32	WS	ELO-GB	GB-QR MULTI-LEVEL
GB-EC	GBR	BB1	ELO-LH	ELO-231 GBQR	ELO-16 GB FR

CENTRAL "DRY" SPRINKLERS (Manufactured from Mid-1970s-2001)

A-I	GB	GB4-EC	ELO-16 GB
H-I	GB-QR	GB4-QREC	ELO-16 GB FR
J	GB4	ELO-231 GB	
K	GB4-FR	ELO-GB QR	

GEM "WET" SPRINKLERS (Sold under Gem name from 1995-2001)

F92T

STAR "DRY" SPRINKLERS (Manufactured from 1996-1998)

ME-I	SG
SG-QR	Q
Q-QR	

CURING CONCRETE

Concrete consists of a mixture of cement, aggregate and water. Desirable properties of concrete include strength and durability.

Properly proportioned concrete needs to be properly cured in order to achieve these properties. In other words the chemical reaction occurring between the cement and water must be allowed to continue in order

[illegible]

that the concrete can adequately cure or set. Curing basically requires that the chemical reaction occurring between the cement and the water continues as the concrete ages and reaches its desired strength. ACI 318 requires that concrete (except for high early strength) be maintained above 50 degrees Fahrenheit and in a moist condition for at least 7 days after placement.

Design strengths are typically referred to as 28 day strengths and typical target residential concrete strengths are between 2,500 psi and 3,500 psi (28 days).

BBRS/DFS ADDRESS CHANGE TAUNTON

Also, please be aware that the address for the Taunton Office has changed. The new address for both the Board of Building Regulations and Standards (BBRS) and the Department of Public Safety (DFS) is:

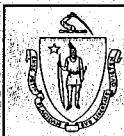
*P.O. Box 871
Taunton, MA 02780-0871*

This address should be used for all regular U.S. postal deliveries. For deliveries made by UPS, Federal Express or other overnight carries, please continue to use the address listed below. Please specify the agency name (BBRS or DFS) and addressee.

*Paul A. Dever School
1380 Bay Street
Taunton, MA 02780*

- Obituary Daniel P. O'Sullivan
- New Certification Committee Members
- Energy Corner BBR5 Offers Refresher Training on Residential Energy Code
- Introducing MecCheck Software
- Conference scholarships Available for Building Officials
- Post Tensioned and Pre-Stressed Concrete Beams
- Licensed Construction Supervisor Disciplinary Actions
- Secretary Perlov Resigns Senator Jajuga Appointed Secretary of Public Safety
- Welcome BBR5 General Counsel Steve Osgood, Esq.
- Vapor Barriers and Concrete Slabs-on-Grade
- Performance and Prescriptive Code Provisions
- Central Sprinkler Company Recalls Sprinkler Heads
- Curing Concrete
- BBR5/DFS Address Change

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AS A PUBLIC SERVICE, *CODEWORD* IS PROVIDED FREE OF CHARGE TO ALL
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