NRCA proposes major changes to BOCA's code

Revisions would provide tools to judge roof installations

by Jeff Lowinski, manager, Technical Services

More and more, building codes are influencing the design and selection of roofs and roof materials. The codes establish the minimum criteria for the design, materials and installation of roofs. Traditionally, these have included fire- and uplift-resistance; structural, snow and rain load requirements; and often prescriptive requirements for materials and fasteners. These requirements are based on the structure's potential use, the combustibility of the structural materials and the building's location.

NRCA has become increasingly involved in the past few years in building codes and the development of building code language regarding roof installation. The Association is concerned that language in present building codes does not address the proliferation of new roofing materials and installation methods. Existing requirements are often prescriptive, rather than performance-oriented.

There'll be some changes made

As a result, NRCA has submitted a major proposal to the Building Officials and Code Administrators International (BOCA) to revise their BOCA Basic/National Building Code. The timing for this proposal could not be better, because BOCA is presently undertaking a thorough reorganization of the Basic/National Building Code. NRCA's submission is a complete revision of the roof and roof covering requirements of the code; the primary objective is to consolidate the requirements into a format that is easy to understand and use in the field.

This code change presents essential criteria that enables the building official to regulate roof systems, and evaluate appropriate alternate roofing products and procedures. Similar provisions are already included in the Southern Building Code Congress International Standard Building Code, the International Conference of Building Officials Uniform Building Code and other model codes, and are being used successfully by building officials. Without such provisions, the building official has no criteria by which to judge the acceptability of roof system design other than its fire retardancy classification.

Changes establish minimums

The Association's code change establishes those parameters that the building code official should consider as the minimum design requirements for roof coverings. The provisions help reduce the problems resulting from improper materials or installation of roof coverings. The proposal is not a how-to manual, however, and specifically avoids prescriptive, unenforceable detail.

With the exception of asphalt shingle, wood shingle and wood shake, the present BOCA code relies exclusively on the fire-retardancy classification and product listing of the roof covering material to establish its installation procedures. The proposed code change includes additional criteria addressing the roof covering's watertightness and serviceability. Especially critical are material standards for the various components used within the roof assembly; requirements for the use of underlayment and ice shields; and fastening and flashing criteria. Criteria are included for the installation of clay, slate, cement and asbestos tile, and for non-classified roof coverings, which do not require fire-retardancy testing and thus have no classification listing.

The existing requirements of the code for the construction of the structural deck are unchanged. Also unchanged are the existing definitions of Class A, Class B, Class C and Non-classified roof coverings; the requirements for the roof covering's fire retardancy on any given structure; and sections on roof-mounted equipment, roof drainage and grounding of metal roofing.

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New provisions added to code

To make a separate chapter on roofs and roof coverings complete, new provisions had to be added to address material standards and application procedures.

American Society for Testing and Materials (ASTM) standards are referenced for asbestos-cement roofing and shingles, asphalt roll roofing and shingles, and for built-up roof coverings. Wood shingles and wood shakes are required to be graded according to Red Cedar Shingle and Handsplit Shake Bureau requirements. Because ASTM standards do not exist, specific sheet metal thicknesses and corrosion-resistance criteria are included for metal roofing and for metal shingles.

New tables have been developed that present the installation requirements for roof covering materials in the sequence that the materials are applied. The data for these tables were developed by a task group of roofing contractors and roof material manufacturers. Reference is made to manufacturers' instructions for criteria not addressed within the tables.

For the installation of asphalt shingles, minimum slope limits are presented along with criteria for underlayment and ice-shield installation in areas subject to wind-driven snow, rain and ice buildup. Requirements are also included for the deck and for shingle attachment.

Built-up roofing section of the proposed code changes.

BUILT-UP ROOF COVERING APPLICATION

	Mechanically fastened systems	Adhered ~~Adhesively bonded~~ systems
Deck requirements	Decks shall be of solid surface and shall have a slope not exceeding that permitted by the built-up roof covering fire-retardant ~~rating~~ classification. ~~Decks shall be firm, broom-clean, smooth and dry. Insulated decks shall have wood insulation stops at all edges of the deck, unless an alternative suitable curbing is provided. Insulated decks with slopes greater than 2:12 shall have wood insulation stops at not more than 8 feet face-to-face. Wood nailers shall be provided where nailing is required for roofing plies.~~	
Underlayment	One layer of sheathing paper, Type 15 felt or other approved underlayment ~~nailed sufficiently to hold in place,~~ is required over board decks, ~~where openings between boards would allow bitumen to drip through. No underlayment requirement for~~ Underlayment is not required for plywood decks. Underlayment on other decks shall be in accordance with approved manufacturer's ~~recommendations~~ instructions.	Not required

BUILT-UP ROOF COVERING APPLICATION

	Mechanically fastened systems	Adhered ~~Adhesively bonded~~ systems
Base ply requirements over noninsulated decks	~~Over approved decks,~~ The base ply shall be ~~nailed~~ fastened using not less than one fastener for each 1½ square feet.	~~Decks shall be primed in accordance with the roofing manufacturer's instructions. The base ply shall be solidly cemented or spot mopped as required by the type of deck material.~~ Decks shall be primed and the base ply shall be cemented to the deck in accordance with approved manufacturer's instructions.
Mechanical fasteners	Fasteners for attaching to wood plank or plywood decks shall be long enough to penetrate ¾-inch into the sheathing or through the thickness of the sheathing, whichever is less. ~~Built-up roofing nails for wood board decks shall be minimum No. 12-gage 7/16-inch head driven through tin caps or approved nails with integral caps. For plywood, No. 11-gage ring-shank nails driven through tin caps or approved nails with integral caps shall be used. For gypsum, insulating concrete, cementit-~~	~~When~~ Mechanical fasteners are required for attachment of roofing to wood nailers or insulation stops ~~they shall be as required for mechanically fastened built-up roof coverings.~~ shall be long enough to penetrate ¾ inch into the wood nailers or insulation stops.

For built-up roofing, requirements are separated for mechanically fastened and for hot-mopped systems. Criteria are presented in the sequence that the materials are applied. Traditional prescriptive requirements for fastener location and for bitumen application have not been used. Instead, the proposal describes when mechanical fasteners or solid mopping should be used. Slope limits are given for backnailing and for aggregate surfacing.

Requirements are given for the installation of roofing tiles, wood shingles and wood shakes. Minimum slope limits, underlayment and attachment criteria are presented as well as maximum weather exposures. These criteria are not in the existing code.

The proposal expands the code to cover requirements for roof valley and other flashings. These new sections address the flashing design and flashing underlayment criteria for each of the various types of roof covering materials.

The proposal requires that only insulation specifically manufactured for roof use be used, and further requires that the use of insulation be consistent with the fire-resistance rating of the roof covering and roof/ceiling construction. This section further requires that mechanically fastened, prepared roof covering materials installed over insulation be furnished with a nailing base.

The code change's provisions help reduce the problems resulting from improper materials or installation of roof coverings.

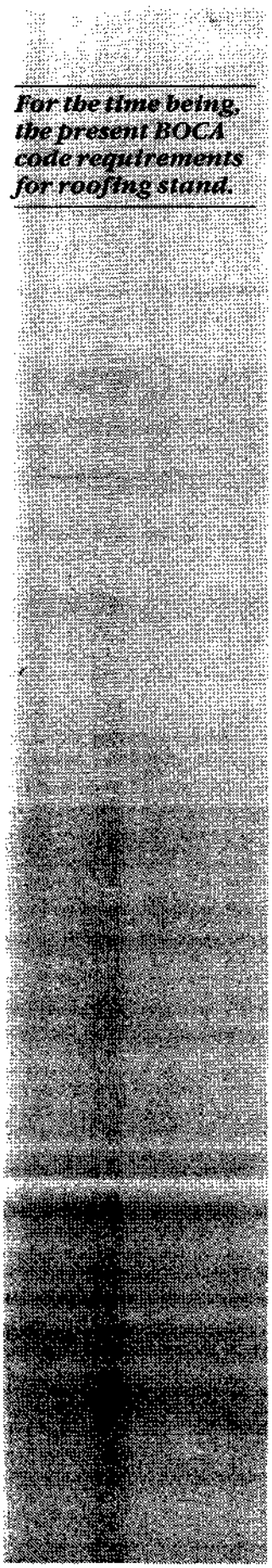
BUILT-UP ROOF COVERING APPLICATION

	Mechanically fastened systems	Adhered ~~Adhesively bonded~~ systems
Mechanical fasteners (cont'd.)	~~ious woodfiber and other decks, fasteners recommended by the manufacturer shall be used.~~ Fasteners for other decks shall be in accordance with approved manufacturer's instructions.	
~~Vapor retarder over insulated decks~~	~~A vapor retarder shall be installed where the average January temperature is below 45 degrees F., or where excessive moisture conditions are anticipated within the building. It shall be applied as for a base ply.~~	
Insulation	When ~~no~~ a vapor retarder is not required, roof insulation shall be fastened in ~~an approved manner.~~ accordance with approved manufacturer's instructions. When a vapor retarder is required, roof insulation ~~is to~~ shall be solidly ~~mopped~~ cemented to the vapor retarder.	When ~~no~~ a vapor retarder is not required, roof insulation shall be solidly cemented ~~mopped~~ to the deck. When a vapor retarder is required, roof insulation ~~is to~~ shall be solidly ~~mopped~~ cemented to the vapor retarder.
Roofing plies	Successive layers shall be solidly cemented together and to the base ply or the insulation. On slopes greater than 1:12, ~~for aggregate-surfaced, or 2:12 for smooth-surfaced or cap sheet surfaced roofs, mechanical fasteners are required.~~ roofing plies shall be blind-nailed to the deck, wood nailers or wood insulation stops. ~~On slopes exceeding 3:12, plies shall be laid parallel to the slope of the deck (strapping method).~~	
~~Cementing materials Adhesive application rates~~	~~For spot-mopping applications of cementing materials, the average weight of hot asphalt or hot coal-tar per 100 square feet shall not be less than 15 pounds, and the~~	

BUILT-UP ROOF COVERING APPLICATION

	Mechanically fastened systems	Adhered ~~Adhesively bonded~~ systems
(cont'd.)	~~average amount of cold-process cement per 100 square feet shall not be less than 1 gallon. For solid applications of cementing materials, the average weight of hot asphalt or hot coal-tar per 100 square feet shall not be less than 20 pounds, and the average amount of cold-process cement per 100 square feet shall not be less than 1½ gallons.~~	
~~Maximum slope limits~~	~~½ inch per foot for Type I asphalt and for coal-tar. 1½ inches per foot for Type II asphalt. 3 inches per foot for Type III asphalt. No slope limit for Type IV asphalt.~~	
Curbs and walls	~~Suitable~~ Cant strips shall be used at all vertical intersections. ~~Adequate attachment shall be provided for~~ Both base flashing and counterflashing shall be provided at ~~on~~ all vertical ~~surfaces~~ intersections.	
Aggregate surfacing	~~Maximum slope limit: 3 inches per foot. For Class A, B and C roof coverings, the average weight of hot asphalt pourcoat per 100 square feet shall not be less than 50 pounds, the average weight of hot coal-tar pourcoat per 100 square feet shall not be less than 60 pounds, the average weight of gravel surfacing per 100 square feet shall not be less than 400 pounds, and the average weight of slag surfacing per 100 square feet shall not be less than 300 pounds. For nonclassified roof coverings, the average weight of hot asphalt pourcoat per 100 square feet shall not be less than 40 pounds, the average weight of hot coal-tar pourcoat per 100 square feet shall not be less than 60 pounds, the average weight of aggregate surfacing per 100 square feet shall not be less than 300 pounds, and the average weight of slag surfacing per 100 square feet shall not be less than 250 pounds.~~ Aggregate surfacing shall be applied in accordance with approved manufacturer's instructions, and shall not be used on roof slopes exceeding 3 inches per foot. A minimum of 50 percent of the amount of aggregate applied shall be embedded in the pourcoat.	

For the time being, the present BOCA code requirements for roofing stand.



One of the more important provisions is the inclusion of an new section on roof replacement and re-covering applications. The new section references the materials and installation requirements for new roofing. Key provisions of this section require that the fire-resistance rating requirements for the building be preserved after reroofing, and that structural roofs be capable of sustaining the loads that will be encountered during reroofing. The section also specifies the conditions that require roof replacement rather than re-covering.

Where we stand

NRCA's proposal has already been critiqued by the roofing industry at large, and by others at the BOCA Mid-Year Code Committee Hearing last January in Hunt Valley, Md. Members of the BOCA Building Code Changes Committee expressed concern about the enforceability of requirements, the specification nature of the material and amount of detail included. There also were a number of technical changes needed to bring the original proposal up to date.

Because of these concerns, the BOCA Code Changes Committee recommended denial of the original proposal, to give NRCA the opportunity to resubmit a clean, modified proposal. This has been done, and the revised proposal removes subjective and permissive language and detailed criteria which, while informative, would be difficult to enforce or verify. As a result, the current proposal is less cumbersome, and places more emphasis on the use of approved manufacturers' installation instructions.

The current proposal incorporates all the revisions offered by the National Forest Products Association, Red Cedar Shingle and Handsplit Shake Bureau, Asphalt Roofing Manufacturers Association, the BOCA Mechanical Code and Plumbing Code committees, and others testifying at the hearing. The chapter now references the most recent editions of material standards, and refers appropriately to the mechanical and plumbing codes for rooftop equipment installation and roof drainage criteria.

This proposed revision is a major step forward toward the understanding and more efficient use of the roof and roof covering requirements of the Basic/National Building Code. The requirements of this proposal will aid the roofing industry by:

- reducing material failures by requiring conformance to accepted material standards;
- reducing sub-standard and inferior assemblies by describing minimum acceptance criteria;
- providing a basis of comparison for new or alternate materials or methods of assembly; and
- addressing minimum criteria for those materials or methods of installation not covered by fire-resistant listings.

The requirements of the code proposal are presented in a logical order and are easily identified. The logical structure of the new section will make future changes easier.

The proposal was set to come before the full delegation at the 71st Annual BOCA Conference, June 22-27 in St.Louis. A two-thirds majority vote of the delegates was needed to overturn the recommendation of the BOCA Code Changes Committee that the proposal be denied.

At the meeting, NRCA's request to override the Code Change Committee's recommendation was voted down. So, for the time being, the present BOCA code requirements for roofing stand. Those that spoke against NRCA's request at the meeting said the proposed code requirements were too specification-oriented. Also, according to comments made at the meeting, the building code officials would have been more receptive to NRCA's request if the proposed changes had been part of a nationally recognized standard that BOCA could have referred to in its code.

In the coming weeks, the NRCA Building Codes Committee will be considering its options. It may attempt to resubmit the code changes at next year's BOCA meeting, hoping to obtain more support from the floor. On the other hand, the Committee may request the formation of a BOCA ad hoc committee to work with NRCA on a new set of revisions to the code. A third option would be for NRCA to draft a document independently that would contain the proposed requirements. If this independant document becomes a widely accepted industry standard, it may then be taken to BOCA for adoption.