

PUBLIC COMMENT on PROPOSED BUILDING STANDARDS
For Publication in Title 24, California Code of Regulations

Instructions

1. Use of this form is optional. Its use will help the California Building Standards Commission (CBSC) and other state proposing agencies to correctly administer your comments.
2. For matters to be considered by a CBSC Code Advisory Committee (CAC), written comments should be received in the CBSC office 7 days before the scheduled CAC meeting to help ensure CAC consideration.
3. For matters subject to a 45-day or 15-day Public Comment period announced by a Notice of Proposed Action (NOPA), written comments must be received on or before the close of the comment period identified in the NOPA available at CBSC website <http://www.bsc.ca.gov/>. Written and oral comments may be provided at the CBSC public meeting to consider the proposed building standards.
4. Separate comment submittals are necessary for CAC and Public Comment periods. Separate comment forms are necessary for each state agency proposal.
5. This form is available in Fill-and-Print format at CBSC website <http://www.bsc.ca.gov/>. Otherwise print the form, type or complete by hand and attach additional sheets if necessary.
6. Submit comments to the CBSC, 2525 Natomas Park Drive, Suite 130, Sacramento, CA 95833-2936, or by Email at cbcs@dgs.ca.gov. Please do not FAX comments.
7. For assistance, call the CBSC at (916) 263-0916, or Email CBSC at cbcs@dgs.ca.gov.

Commenter Identification and Contact Information

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Proposed Building Standard Identification

Title 24 Part No. (circle one) 1 2 2.5 3 4 5 6 8 9 10 11 12 Section No. _____
Proposing State Agency California Building Standards Commission CBSC
The proposed building standards is: Before a CAC In a 45-day Comment Period
(check one) In a 15-day Comment Period.
Your recommendation based on the criteria of Health and Safety Code Section 18930(a) printed on the reverse side is: (check one)
 Approve Disapprove Further Study Required Approve as Amended

Comment/Suggestion on Title 24 Proposed Building Standard:

see comments attached

Identification of Attachments

Check if you have attached additional pages. The number of pages attached: 3

For CBSC Office Use Only: Date Received: _____ Rulemaking Item # _____

Health and Safety Code Section 18930(a) reads:

(a) Any building standard adopted or proposed by state agencies shall be submitted to, and approved or adopted by, the California Building Standards Commission prior to codification. Prior to submission to the commission, building standards shall be adopted in compliance with the procedures specified in Article 5 (commencing with Section 11346) of Chapter 3.5 of Part 1 of Division 3 of Title 2 of the Government Code. Building standards adopted by state agencies and submitted to the commission for approval shall be accompanied by an analysis written by the adopting agency or state agency that proposes the building standards which shall, to the satisfaction of the commission, justify the approval thereof in terms of the following criteria:

- (1) The proposed building standards do not conflict with, overlap, or duplicate other building standards.
- (2) The proposed building standard is within the parameters established by enabling legislation and is not expressly within the exclusive jurisdiction of another agency.
- (3) The public interest requires the adoption of the building standards. The public interest includes, but is not limited to, health and safety, resource efficiency, fire safety, seismic safety, building and building system performance, and consistency with environmental, public health, and accessibility statutes and regulations.
- (4) The proposed building standard is not unreasonable, arbitrary, unfair, or capricious, in whole or in part.
- (5) The cost to the public is reasonable, based on the overall benefit to be derived from the building standards.
- (6) The proposed building standard is not unnecessarily ambiguous or vague, in whole or in part.
- (7) The applicable national specifications, published standards, and model codes have been incorporated therein as provided in this part, where appropriate.
 - (A) If a national specification, published standard, or model code does not adequately address the goals of the state agency, a statement defining the inadequacy shall accompany the proposed building standard when submitted to the commission.
 - (B) If there is no national specification, published standard, or model code that is relevant to the proposed building standard, the state agency shall prepare a statement informing the commission and submit that statement with the proposed building standard.
- (8) The format of the proposed building standards is consistent with that adopted by the commission.
- (9) The proposed building standard, if it promotes fire and panic safety, as determined by the State Fire Marshal, has the written approval of the State Fire Marshal.



9/28/2017

waterproofing Exterior Elevated wood decks

STATE OF CALIFORNIA BUILDING STANDARDS COMMISSION

Initial Express Terms - 45 day August 14, 2017 BSC Amendments to 2016 CBSC – Certifying Rulemaking 1 OF 3 BSC-EF-01-17 - Parts 2,10 California Building Standards Commission

EXPRESS TERMS FOR PROPOSED BUILDING STANDARDS OF THE CALIFORNIA BUILDING STANDARDS COMMISSION REGARDING PROPOSED CHANGES TO THE CALIFORNIA BUILDING CODE, PART 2 & THE CALIFORNIA EXISTING BUILDING CODE, PART 10 CALIFORNIA CODE OF REGULATIONS, TITLE 24

Your proposed changes to the building standards regarding Exterior Elevated Wood Decks is a good start. But in truth, it most likely won't prevent a future collapse similar to the one that that happened in Berkeley California.

This issue came about as a result of a balcony collapsing in Berkeley CA. The issues described in CLSB's report are numerous (and complex) but for experts like myself, they are not surprising. Furthermore, the remedies proposed, such as better inspections, more robust underlying wood frames, better and clearer installation instructions and details from manufacturers, etc sound good. But they will do little if any to solve or prevent future failures such as the one in Berkeley CA.

Why? Because they fail to address the main underlying problem.

Waterproofing assemblies that require the membranes be installed directly onto the plywood substrates are too risky since they cannot mitigate the primary risk factors!

More about that in a minute...

Unlike concrete substrates, wood frames are much more susceptible to catastrophic structural failures when exposed to water over time. As such they need to be waterproofed with the highest standards. However, plywood substrates pose several added potential risks that do not exist in concrete substrates and MUST be addressed to ensure waterproofing integrity over time. These are:

Plywood joints	They tend to move over time and put extra stresses on the membranes in these areas. Many membranes fail at the plywood joints over time.
Nails backing up	<u>(This is the biggest problem in my opinion)!</u> As the buildings age, they expand and contract with temperature changes and settle over time. In many instances, nails start migrating upwards, puncturing the soft membranes installed over them and create leaks.
Straps	In some cases, structural metal straps are installed to tie sections of buildings together. They are laid flat on the surface and have many nails to hold them in place. These straps can easily be 3 or 4 feet long, 1/8" thick and have nails on each side every 3 inches or so. Nails never sit flush over these straps creating sharp protrusions over them that tear membranes over time. Furthermore, the sides of the straps have sharp edges that tear the membranes as well.

Other issues that apply to both concrete and wood substrates (but are less forgiving over wood substrates) are:

Insufficient Slopes	On horizontal decks, if there is insufficient slope, it will tend to hold water.
Insufficient drains	Standing water can be further exacerbated if there are not enough drains, scuppers etc.
Drainage Boards	In topping slabs (sandwiched systems) it's critical to also have a proper drainage board installed between the membrane and topping slab to ensure water has an un-obstructed pathway to the drains
Protection	In topping slabs (sandwiched systems) it's critical to ensure the membrane is protected from physical damage. While drain boards offer some protection, adding a protection panel is highly recommended, especially over the higher risk wood frame substrates.

But even if you did everything right, many waterproofing systems still don't mitigate these basic risks.

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These are: **Waterproofing assemblies that require the membrane be installed directly onto the plywood substrates!** Regardless of brand or technology, all these membranes are soft and flexible. Which means that they will ALWAYS be at high risk for failures due to plywood joint movements, nails backing up, etc.

Add to that real-world conditions (some of which you are trying to solve with these new rules) and typical value engineering that takes place and it only gets worse. These issues include:

1. Insufficient slopes
2. Insufficient drains
3. Poor flashings
4. Membranes installed too thin.
5. Membranes installed without proper prep (without primers, without joint preparations and reinforcement, etc)
6. Systems installed with incorrect drain boards, or drainage fabric in lieu of drainage boards or none at all.
7. Systems installed without proper protection.
8. Many installations I've seen have had several of the above conditions simultaneously.

As you can see, elevated wood decks are at very high risk of not being properly waterproofed or not being able to maintain waterproofing integrity over long periods of time.

Solutions:

By far, the number one change should be:

DO NOT ALLOW ANY MEMBRANE BE DIRECTLY INSTALLED OVER PLYWOOD SUBSTRATES UNTIL FURTHER NOTICE!

If you made this one change alone, you would eliminate 99% or more of the potential causes for leaks to occur.

How will this affect the industry in practical terms:

There are basically three types of systems being installed over wood decks.

- Deck Coatings
- Sandwiched systems (Membrane + topping slab, pavers, etc)
- Tile/Stone systems

In an emergency, you can eliminate sandwiched systems altogether until further notice since these systems are the ones with the highest risks and most problems. This will allow time for these systems to be thoroughly reviewed and proper system requirements to be established. However, this is an extreme step to take, since these systems are very well liked and can be installed successfully if they meet the requirements listed below and monitored and signed off after completion by a professional waterproofing consultant.

Here is how I recommend each type of system be allowed to be installed from now on:

Deck Coatings:

- Only allow ICC or IAPMO Approved deck coatings that meet the following criteria:
- Must have a valid ICC or IAPMO approval for Pedestrian Traffic Coatings (Based on AC39 or equal)
- ICC or IAPMO approvals must include both a Class-A and 1-hour fire ratings
- ICC/IAPMO approval must meet the latest building codes (2015 IBC & 2015 IRC)
- On new construction, do not allow zero slope. Min slope allowed should be 1/8"/foot (1/4" is recommended and preferred)
- Do not allow any system even if it meets the above criteria if their membrane layer is installed directly onto the plywood substrate!
- Do NOT allow deck coating systems without an independent waterproofing membrane! (Yes, they exists!)



Sandwiched Systems:

- Only allow systems that meet the following criteria:
- Membranes should not be allowed to be installed directly on plywood.
- Require that a minimum ¼” concrete layer be installed over the plywood substrates prior to installing any membrane. This will turn the substrate into a monolithic surface and eliminate all the plywood joint and nails backing up issues.
- Require that the concrete layer up to 1.25” thick be reinforced with metal lath 2.5 Lbs/sq.yard and be a min 3000 PSI. Polymer additive is highly recommended. (You can use our AVM Crete 6400 as a basis for design, but many similar products exist)
- Require that the concrete layer above 1.25” thick be reinforced with metal wire (4”x4”), and must be a min 3000 PSI.
- Require that the final substrate to which the membrane will be applied to (the concrete layer) have a min 1/8” slope to ensure proper drainage. (1/4” is recommended and preferred)
- Require min thicknesses and reinforcement as per table below.
- Require separate protection layer Asphaltic panels, Hardi-Backer or similar.
- Require a proper drainage board (Min ½” thick and approved by the manufacturer) for horizontal applications under concrete. (Drainage board will not be required for Pedestal+Paver systems)

Min thickness and reinforcement requirements by product type

Membrane Type	Min Thickness	Fully Reinforced	Notes
Hot Rubber	210 Mils DFT	Yes (min 1 layer of fabric)	
Cold applied Bitumen	180 Mils DFT	Yes (min 1 layer of fabric)	
Cold applied Polyurethane	120 Mils DFT	No (Only at edges, corners, etc)	
Acrylics	25-40 mils DFT	Yes, one layer.	Fabric to be fully saturated with resin
Hot applied torch down membranes	Should not be approved for applications over low slope horizontal elevated wood decks		
Cold applied Sheet Membranes	Should not be approved for applications over low slope horizontal elevated wood decks		

Tile Systems:

- Only allow ICC or IAPMO Approved tile waterproofing membranes that meet the following criteria:
- Membranes must have a valid ICC or IAPMO approval for tile waterproofing (Based on AC115 or equal)
- ICC/IAPMO approval must meet the latest building codes (2015 IBC & 2015 IRC 2015 IPC, 2015 UPC)
- Membranes should not be allowed to be installed directly on plywood.
- Require that a minimum ¼” concrete layer be installed over the plywood substrates prior to installing any membrane. This will turn the substrate into a monolithic surface and eliminate all the plywood joint and nails backing up issues.
- Require that the concrete layer up to 1.25” thick be reinforced with metal lath 2.5 Lbs/sq.yard and be a min 3000 PSI. Or, meet TCNA’s standards per TCNA handbook. Polymer additive is highly recommended.
- Require that the concrete layer above 1.25” thick be reinforced with metal wire (4”x4”), and must be a min 3000 PSI. Or, meet TCNA’s standards per TCNA handbook.
- Require that the final substrate to which the membrane will be applied to (the concrete layer) have a min 1/8” slope to ensure proper drainage. (1/4” is recommended and preferred)
- Membrane thickness, prep and reinforcement requirements (if any) and installation instructions must be per the ICC or IAPMO approval.
- Thin-set, tile or stone applications must be in accordance with TCNA’s hand book.

I believe this is a good starting point. Obviously, there will be winners and losers which will lead to you being pressured to allow all kinds of exceptions. I am looking forward to working with you in the future on this subject matter and assist you in providing the best fastest and safest path forward with respect to long term waterproofing of elevated wood decks.

Sincerely,
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