STRUCTURAL ENGINEERS ASSOCIATION OF CALIFORNIA

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October 19, 2015

California Building Standards Commission
c/o Michael Nearman, Deputy Executive Director
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833

Subject: Agenda Item 8 for October 21, 2015 meeting
Building code amendments for occupied, elevated, weather-exposed building areas

Dear Commissioners:

The fatal balcony collapse of June 16, 2015 in Berkeley, California is a sobering reminder of the importance of building codes, sound design practice, sound construction practice, and ample construction quality assurance practice. In response to this unfortunate event, the Structural Engineers Association of California (SEAOC) convened an ad-hoc committee to discuss issues related to occupied, elevated, weather-exposed, wood-framed building areas, such as projecting balconies and exterior stairs, referred to hereafter as exterior elevated elements, or EEEs. SEAOC is a not-for-profit organization comprising practicing structural engineers and researchers. Its mission includes providing the public with safe and dependably performing structures.

The design and construction of EEEs are challenging endeavors complicated by the need to satisfy the multiple, often competing, objectives of structural safety, water resistance, fire safety, long life and aesthetics. There is no single solution to creating well performing EEEs, but implementation of the measures described below will facilitate improved performance. Implementation of the measures should be pursued at the state and national levels, and SEAOC welcomes the opportunity to participate in that process.

SEAOC has reviewed the letter the Berkeley City Council sent to the BSC urging the BSC to introduce more restrictive standards concerning the design of EEEs. In that letter the Council suggests amending the California Building Code to require EEE construction to include: 1) materials resistant to deterioration due to fungal decay; 2) ample ventilation enabling water that reaches structural components an opportunity to quickly evaporate; and 3) a means for periodically accessing concealed structural components to assess their condition state as a routine, preventative maintenance measure. Berkeley further proposes an additional code amendment requiring EEEs' construction to consist of corrosion resistant steel if the three forgoing attributes are not employed.

SEAOC supports the general intent of the Berkeley City Council's letter, but recommends the following, somewhat different course of action:

1. Review water barrier requirements in the California Building Code and the California Residential Code: A review of current building code requirements regulating the design, construction and construction inspection of water barriers is recommended. The most important and most efficient means of mitigating the risk of poor EEE performance, as seen in Berkeley on June 16, is to provide a competent water barrier. Inhibiting water from entering the building envelope will increase the safe performing life of EEEs. If the code lacks adequate regulation in these areas, the code ought to be amended accordingly. If current code is deemed to adequately regulate these areas, code enforcement practices ought to be evaluated.

2. Review ventilation requirements in the California Building Code and the California Residential Code: A review of current building code requirements concerning ventilation for wood framed EEEs is recommended. Water contact with wood framing is not necessarily a hazardous condition. Wood generally retains its structural integrity if exposed to water provided adequate ventilation is present that enables the water to evaporate relatively quickly. Wood exposed to water in concealed conditions where water evaporation occurs more slowly fosters fungal growth. Various fungi species consume wood, which precipitates decay and compromises structural integrity. If ventilation requirements do not exist, the code ought to be amended accordingly. Code changes introducing requirements to provide ventilation openings ought to consider the consequences to the affected elements' fire rating.

3. Consider introducing requirements in the California Building Code and the California Residential Code to improve the durability of EEEs' structural members where the structural members are concealed: SEAOC supports discussion of possible amendments to the building code to require primary structural members in some EEEs to be constructed of decay resistant materials, especially in instances where it is possible for water to become trapped in concealed compartments where wood framing is present.

   Decay-resistant materials include naturally durable wood, preservative treated wood, properly galvanized hot-rolled steel, stainless steel, corrosion resistant metals or a combination thereof. These durable materials serve as a secondary safety measure should water inadvertently breach the water barrier. Light-gage, cold-formed steel is not recommended in this application.

   While no material is deterioration-proof when exposed to water for protracted durations, resistant material can incrementally prolong the safe life of structural members. Longer life heightens the likelihood of detecting deterioration prior to structural failure, particularly in concealed conditions that lack ventilation or where water has inadvertently breached the weather barrier. For example, in the case of projecting, cantilevered balconies, soffits are often coated with paint that is impervious to water. Water that breaches a deficient water barrier and becomes trapped will not necessarily manifest as stains on the soffit surface. Without stains to warn water is present, fungal growth can progress undetected until structural

integrity is severely compromised.

Introducing code changes can result in unintended consequences and caution must be exercised. If a requirement to employ durable structural materials in EEEs is introduced and preservative treated wood is included among acceptable durable materials, the chemical compatibility of preservative treated wood in contact with metal fasteners in the sustained presence of water will have to be evaluated. Chemicals used in wood preservatives are known to accelerate corrosion of some steel fasteners in certain circumstances. If water infiltrates the building envelope, metal structural connectors, such as nails, bolts, and joist hangers, are vulnerable to strength loss if in sustained contact with preservative treated wood and water.

The poor performance of EEEs is generally attributable to a combination of unfavorable circumstances. Safeguarding against poor EEE performance requires consideration of the multiple components that constitute EEEs and their performance in the presence of water. SEAOC would welcome the opportunity to assist the BSC and other state agencies with the complex task of developing building code amendments that foster the design and construction of safe EEEs.

Sincerely,

Kelly Cobeen, SE
President, Board of Directors
Structural Engineers Association of California

Jeff Taner, SE
Co-Chair, Ad-hoc Committee on Elevated Exterior Elements
Structural Engineers Association of California

CC:
Berkeley City Council c/o Rose Thomsen, Deputy City Clerk
Mr. Eric Angstadt, Director, City of Berkeley Planning and Development Dept.
Mr. Alex Roshal, Manager, City of Berkeley Building and Safety
Mr. Shawn P. Huff, Assistant Deputy Director, Dept. of Housing & Community Development
Mr. James Hackett, Supervising Structural Engineer, Division of the State Architect