2023 OCSD BUILDING CODE

Introduction

This Orange County Sustainability Decathlon (OCSD) Building Code is supplemental to the code(s) and other requirements enforced by the team's *final Authority Having Jurisdiction* (AHJ). Special considerations are provided in Section 1 regarding the OCSD Competition Event and public occupancy period. Section 2 provides guidance on building safety considerations beyond the competition and for the long-term users/occupants of the structure. It is the responsibility of each OCSD team to fulfill the initial permitting requirements (as applicable) of their *final AHJ* or other approved *third-party* evaluator in order to obtain a building permit or other locally accepted and defined procedure *approved* by the OCSD Building Official prior to commencing construction.

Objective

1. To provide an acceptable level of building safety performance for occupants during public exhibit periods associated with the OCSD competition at the assembled village in Costa Mesa, CA.
    a. This objective will be satisfied by successful proof of compliance with the OCSD Building Code
2. To provide for long term building safety for users/occupants after the OCSD competition concludes.
    a. This objective will be satisfied by successful proof of compliance with local governmental building code permitting and inspection processes or by standard oversight practices permitted or customary to the local authorities.

Definitions

Italicized terms used in this document shall have the following meanings.

Alternative Evaluation Process. A formal process by which a OCSD team applies to the OCSD building official for consideration of an alternative means to qualify a material, method of construction, or method of design that is not evaluated or recognized by an existing, *approved* standardized consensus process. The means of demonstrating performance equivalency is first proposed by the team and modified as necessary to the concurrence of the building official.

Approval. Approval is that which is accepted by the OCSD building official.

Third-Party. An *approved* individual or agency having the appropriate credentials to perform a specific evaluation task.

1. OCSD Event Building Performance Code

Objective

To provide an acceptable level of building safety performance to occupants during public exhibit periods associated with the OCSD public display and competition at the temporary event site in Costa Mesa, CA.

Assessment Components

101 Interior fire propagation control strategy
102 Event egress strategy
103 Event occupant fall protection strategy
104 Disabled accessibility strategy
105 High temperature mechanical systems strategy
106 Alternative construction safety strategy
107 Electrical safety strategy
108 Event location structural stability strategy
109 Other unique circumstances requiring a safety strategy

101 Interior Fire Propagation Control Strategy

101.1 Fire Potential

Exposed permanent interior surfaces shall be constructed and maintained in a manner that limits the potential for interior surface fire propagation. Interior contents such as furniture and draperies shall be provided with reasonable fire performance characteristics.

101.2 Time for Evacuation.

Facilities shall be designed, constructed, maintained, and operated with appropriate safeguards in place to limit the spread of fire and products of combustion so that occupants have sufficient time to escape the fire.

101.3 Performance Requirements.

Houses or portions thereof shall be designed, constructed, and operated to normally prevent any fire from growing to a stage that would cause life loss or serious injury, taking into account all anticipated and permitted fire loads that would affect its performance.

101.3.1 Interior Surface Finishes.

Interior surface finishes on walls, floors, ceilings, and suspended building elements shall resist the spread of fire and limit the generation of unacceptable levels of toxic gases, smoke and heat appropriate to the design performance level and associated hazards, risks and fire safety systems or features installed.

101.3.1.1 Compliance methods.

1. Materials evaluated and listed as providing a minimum Class C finish rating in accordance with UL723 or ASTM E84, or
2. Materials not meeting the minimum prescriptive standards where *approved* and where protected with an *approved* quick response fire sprinkler system, or
3. Materials evaluated and listed as providing a minimum Class B1 in accordance with DIN 4105, or
4. Materials evaluated and listed as providing a minimum Class B in accordance with EN 13501-1, or
5. Materials evaluated and *approved* through an *alternative evaluation process*.

101.3.2 Detection and notification.

It is assumed that human intervention is necessary to limit the fire impact by direct action of facilitating egress and performing appropriate actions as warranted. Early or remote detection of incipient fires is essential for rapid evacuation during the OCSD public exhibit.

101.3.2.1 Compliance methods.

1. *Approved* smoke detection and alarm system listed and labeled in accordance with UL 217, EN 54 Part 7, or other *approved* standard and,
2. *Approved* placement of smoke detection equipment and audible notification appliances and,
3. *Approved* provision, location, and operator training of portable fire extinguishing equipment.

102 Event Egress Strategy

102.1 Evacuation necessity.

Rapid and effective evacuation of OCSD public exhibit structures is essential to mitigate personnel injuries. Evacuation may be initiated by multiple threatening stimuli, including but not limited to smoke, fire, unanticipated severe weather, natural disaster, dangerous occupant actions, or other sources.

102.2 Evacuation assessment.

Facilities including enclosed occupied buildings; exterior structures such as decks, elevated ramps, and walking surfaces; and developed portions of sites shall be evaluated and designed for rapid egress in the event of an initiating emergency.

102.3 Assessment requirements.

As each OCSD exhibit building and associated structure(s) is unique as to construction methods, plan configuration, and proposed design occupant load, each must be individually assessed and *approved* prior to public occupancy.

102.3.1 Compliance methods.

1. Building interior floor plan indicating locations of *approved* egress doors, portable fire protection equipment, design maximum occupant load for each room or space occupied during public exhibit and,
2. Building interior reflected ceiling plan indicating locations of *approved* smoke detectors or smoke alarms and location of notification appliances and,
3. Building exterior floor plan indicating raised decks, walking surfaces, ramps, fences, guardrails, handrails, and other elements that affect or restrict egress travel and,
4. Building grounds site plan indicating locations of defined walkways, fences, vegetation, and other site elements that affect or restrict egress travel between buildings, their connected built elements, and the public way or defined safe assembly point and,
5. A written evaluation of presumed emergency initiations, egress methodologies, exhibit tour decathlete personnel evacuation assistance roles and responsibilities, and proposed pre-event training and drills. A separate guidance document will be provided to OCSD teams to further explain compliance strategies for this item.

103 Event Occupant Fall Protection Strategy

103.1 Personnel injury potential.

The statistical majority of accidental injuries in buildings occur within stairways, single riser changes in elevations (steps), and raised platforms.

103.2 Necessary safeguards.

OCSD buildings and exterior structures accessed during the public exhibit shall be designed to mitigate the risk of accidental injury from elements with elevation changes.

103.3 Assessment Requirements.

OCSD teams shall identify any elevation changes that may pose a risk to building occupants during the public event.

103.3.1 Assessment Criteria

1. Changes in elevations occurring along routes used by the public should be avoided where practicable or where not truly essential to the building or site's architecture or overall aesthetics. Elevation changes such as steps or stairs used along public routes are redundant as an inclusionary disabled accessible route is mandatory under Section 104. Changes in elevations along routes used by the public shall be evaluated for ramifications of potential falls. This shall include, but not be limited to hazards present such as glazing, glass elements, sharp objects, objects heated to injurious temperatures by sunlight or by mechanical processes, and other potentially harmful elements or conditions. Provision of handrails and guards on both sides of the elevation change will be considered an essential mitigation component.
2. Raised platforms with human occupancy shall be provided with sufficiently high fall barrier guards at platform edges or offset the occupants by a sufficient depth from the platform edge. Assessment should consider the height of the elevation change and consequences of a potential fall.
    a. United States building codes prescriptively stipulate that a change in elevation in excess of 30 inches (762mm) is a hazard requiring a mandatory guard.
    b. United States building codes prescribe a 200 pound (0.89 kN) force applied at any location along the upper portion of the guard and 50psf (0.22kN) force for guard infill components.

104 Disabled Accessibility Strategy

104.1 Inclusionary vision.

The OCSD public event is intended to be inclusionary whereby individuals with mobility and sight impairments are afforded access to all portions of the site and building(s) open for public exhibit occupancy. Colleges and universities in the United States are Title II entities governed by the Americans with Disabilities Act, requiring access to their programs and facilities.

104.2 Inclusionary assessment.

Building and site tour locations and connected routes shall be evaluated for acceptable disabled access during the public exhibit event period. Other accessible elements may be exhibited in excess of those necessary for the public as desired to accommodate the needs of intended or real users after the conclusion of the public exhibit.

104.3 Assessment requirements.

Disabled access pertains only to locations and functions permitted to the public during the exhibit events. Access requirements do not extend to plumbing fixtures or other building operations provided those features are not available to use by the public or decathletes during public occupancy.

104.3.1 Compliance Methods

1. For buildings and sites exhibited within the United States and its territories, design documentation sufficient to show compliance with the Americans with Disabilities Act, 2010 Standard for Accessible Design. Buildings built and retained by universities are deemed Title II entities and must typically provide access to all portions of the occupied building including levels located above and below the accessible entrance level. See https://www.ada.gov/2010ADAstandards_index.htm for scoping and design criteria. ADA "program access" alternatives may permit the use of alternative program communication methods if provision of physical access is demonstrated by the team to be substantially infeasible. The alternative may involve the use of a video tour posted to an WCAG2.0 compliant website and provided simultaneously at an accessible location at the tour site facility.
2. For buildings constructed and intended for use in the State of California, compliance with Title 24 of the California Code of Regulations may be employed. Compliance regulations can be found here: https://www.dgs.ca.gov/DSA/Resources/Page-Content/Resources-List-Folder/Access-Compliance-Reference-Materials

105 High Temperature Mechanical Systems Strategy

105.1 Personnel injury potential.

Mechanical systems conveying liquids or gases in excess of 120°F (49°C) have the potential to cause injurious scalding and burns. Systems assembled by teams from components (solar thermal, bespoke heat transfer apparatus, etc.) are not normally laboratory tested and listed, requiring added site commissioning prior to operation.

105.2 Additional safeguards.

As a measure to improve the safety of the decathletes and touring public, pressure testing of conveying piping and components shall be conducted in advance of full system operation under heated conditions.

105.3 Assessment requirements.

At least one of the following methods shall be conducted prior to the heating of fluids and gases in process piping.

105.3.1 Compliance Methods

1. Hydrostatic test at a pressure of not less than 100 psi (690 kPa) for no fewer than 15 minutes. Temperature and pressure relief devices on the system that actuate below the design test pressure may be temporarily plugged, capped, or removed from the system. The test shall be witnessed by the OCSD Building Official during event site building inspection activities.

2. For systems with piping configurations or components incapable of withstanding the test pressure prescribed in Item 1 and using a low-pressure safety relief valve, an *approved* alternative test may be employed. The test shall be witnessed by the OCSD Building Official during event site building inspection activities.

106 Alternative Construction Safety Strategy

106.1 Innovation acknowledgement.

New innovative technologies are encouraged in the OCSD exhibition and competition. These new technologies frequently occur in advance of conventional building codes and standards and established evaluation criteria and methods.

106.2 Innovative technologies assessment.

To facilitate the approval and safe demonstration of new technologies, the OCSD Building Code sets forth a simplified procedure for assessment and *approval* using an *alternative evaluation process.*

106.3 Assessment methodology.

Any material, design method, or equipment not specifically recognized in an *approved* building code or standard is deemed an alternate requiring an *alternative evaluation process*. The following is intended to guide the disclosure, evaluation, and approval process.

106.3.1 Assessment process.

1. The OCSD team determines and discloses to the OCSD Building Official new, unregulated technology or design method to the OCSD Organizers and the Building Official. Such disclosure and supporting documentation shall be made in writing to the OCSD Competition Manager.
2. Design documentation is provided as necessary to describe the material, method, or equipment with a narrative as to its intended application or use.
3. The OCSD Building Official works in conjunction with the team to determine what, if any testing or other evaluation is necessary to qualify the alternative for safe demonstration in the OCSD public exhibition.
4. The OCSD team provides results of testing or other evaluation to the OCSD Building Official for review.
5. The OCSD Building Official issues an approval based on successful completion of the evaluation using the methodology agreed upon in Item 3.

107 Electrical Safety Strategy

107.1 Personnel injury potential.

Electrical systems have the potential to initiate building fires and otherwise pose electrocution injury to building occupants.

107.2 Assessment requirements.

At least one of the following methods shall be conducted to ensure electrical safety during the public exhibition.

107.2.1 Compliance Methods

1. Electrical inspection conducted and approved by local government agency or certified third party inspection program where such inspections are part of the local permitting process. Such inspections will include interstitial wiring methods assessment and installed electrical equipment approval.

2. In localities not provided with a governmental or third party inspection program, certification of wiring, equipment and system functionality by an appropriately licensed electrical contractor, electrical engineer, or other *approved* electrical subject matter expert.

108 Event Structural Stability Strategy

108.1 Personnel injury potential.

Building collapse, displacement, or other structural failure has the potential to injure building occupants during the public event. As the buildings will be exhibited absent a permanent, anchored foundation, alternative means to transmit gravity loads and resist the effects of lateral displacement must be addressed.

108.2 Assessment requirements.

The following temporary event structural criteria and accommodating design must be considered.

1. The temporary event foundation system must be capable of transferring gravity loads from the main building(s) and associated occupied structures to the event paved surface. This may be affected by load distribution pads or plates to leveling jacks or other vertical support to building chassis, beams, or other load distributing members.
2. The building(s) and associated structures must be capable of withstanding a 60mph, 3 second gust without foundation collapse, overturning, excessive displacement, or other detrimental failure. Building plan aspect ratios with long sides combined with slender ends may require some form of ballast support due to the event site's prohibition on ground penetration. Building dead load analysis may be employed in calculating overturning and sliding resistance.

109 Other Unique Circumstances Requiring a Safety Strategy

109.1 Unique circumstances.

The innovative nature of the OCSD and promotion of new and advanced technologies by OCSD teams may present unique conditions requiring additional building safety assessment.

109.2 Unique circumstances assessment.

The OCSD Building Official will notify a team that unique circumstances are present and that a special assessment process will be required. Such assessment will be limited to reducing determined risks to building occupants during the public exhibition period. The assessment may be in addition to or parallel to what is required by the local authority.

109.3 Assessment methodology.

Assessment methodology will be determined as necessary to affect risk reduction for the unique circumstances presented. Such methodology will be developed as a collaboration of both the OCSD Building Official and designated members of the affected OCSD team. Final *approval* of the assessment methodology employed will be made by the OCSD Building Official.

2. Long Term Building Safety

Objective

To provide for long term building safety for users/occupants after the OCSD public event competition concludes. This includes but is not limited to assessment and design considerations for the final site's wind, snow, and seismic design values.

Assessment Components

1. **Compliance from an *approved* governmental agency.**
2. **Compliance by locally accepted practice.**

201 Compliance from an Approved Governmental Agency.

201.1 Approved governmental agency.

OCSD teams may satisfy this objective through a variety of governmental processes. Governmental processes assume that a local, state, or federal governmental agency adopts and enforces a building code and/or standard appropriate for the intended long-term use of the building(s).

1. Local town, city, village, township, county, or other subdivision of the state building department certificate of occupancy. Proof of satisfactory completion of all "rough" inspections provided prior to any event public occupancy.
2. State issued manufactured housing certification or certificate of occupancy.
3. Special district or local government preempted university building construction program when *approved*.
4. Federal government preempted or other exempt jurisdictions with *approved third-party* certification.

202 Compliance by accepted practice.

202.1 Compliance by local practice.

OCSD buildings built in locations where no governmental oversight is provided for compliance with building safety standards shall be permitted to qualify long term safety through one of the following means.

1. Certification by an *approved* licensed or otherwise legally designated architect or engineer to an *approved* local or international building code or standard.
2. Certification by an *approved third-party* inspection agency to an *approved* local or international building code or standard.
3. Certification by an alternative *approved* means where Items 1 or 2 are determined not feasible.

3. OCSD Village Building Placement

This section establishes minimum setbacks for buildings placed on OCSD Village lots during the event competition at the Orange County Event Center in Costa Mesa, CA

301 - Lot setbacks for buildings and structures

301.1 Building Wall Setback

Buildings elements provided with walls shall be set back from side lot lines by a minimum distance of 5 feet (152 cm). Eaves, roof overhangs, combustible pilasters and trim is permitted to encroach into the required setback by a maximum of 12 inches (30.5cm). The wall plane setback dimension will be taken from the center of the organizer provided lot line to the face of the wall's exterior cladding material.

301.2 Building Structures without Walls

Combustible building structures not provided with vertical walls (decks, ramps, stairs, planter boxes, etc.) shall be set back from side lot lines by a minimum distance of 12 inches (30.5cm). The setback dimension will be taken from the center of the organizer provided lot line to the outer face of the building element.

Exception: Building elements placed directly on the ground and which do not extend more than 6 inches (15.2cm) above the ground shall be permitted to extend to the edge of the organizer provided building lot line.