OREGON FIRE CODE
Interpretations and Technical Advisories

A collaborative service by local and state fire professionals, along with our stakeholders and customers, to provide consistent and concise application of Oregon's fire prevention and life safety regulations.

Date: November 13, 2017

Ruling: Technical Advisory (TA) No. 17-02

Subject: Emergency Responder Radio Coverage (ERRC) TA

Code Reference: 2014 *Oregon Fire Code* (OFC), Sections 510 and 1103.2; *National Fire Protection Association* (NFPA) *National Fire Alarm and Signaling Code* - NFPA 72, 2013 Edition.

Purpose: The purpose of this Technical Advisory (TA) is to provide clear and consistent application of emergency responder radio coverage (ERRC) requirements in Oregon.

Content: The following Technical Advisory (TA) is hereby adopted by the OSFM in this ruling:

Background: ERRC provisions require certain buildings to have approved radio signal coverage so emergency responders can communicate with each other when entering a building. The OFC addresses such matters as types of buildings required to have radio coverage, radio signal strength, amplification systems permitted, signal boosters, and other requirements addressing coverage of communications.

Buildings subject to ERRC requirements are subject to the construction component requirements described in the Oregon Structural Specialty Code (OSSC). Construction requirements include such specifications as waterproof cabinets and shaft enclosures.

Question #1: ***Do ERRC requirements apply to all new buildings?***

Answer #1: **No**. ERRC provisions are only applicable to the specific building types listed in the scoping provisions of OFC Section 510.1.1 #1 through #5. Items #1 through #4 are prescriptive in nature. Item #5 is to clarify that regulated buildings with acceptable coverage, as demonstrated through the signal strength testing requirements in OFC Section 510.5.3, do not require ERRC equipment, such as a Distributed Antenna System (DAS), Bi-Directional Amplifiers (BDA), etc.

Question #2: ***Do ERRC requirements apply to all existing buildings?***

Answer #2: **No.** When applying OFC Section 1103.2, unless the respective municipality has amended this section locally or it is an exempt jurisdiction, the statewide adoption of Chapter 11 applies to existing buildings constructed prior to the state building code applicable at the time of construction, which was July 1, 1974. Any existing building constructed after that date, and in conformance with the code in effect at the time it was build, is deemed to be in compliance and the retroactive requirements of Chapter 11 do not apply. This creates a regulatory gap between July 1, 1974 and June 30, 2010 where ERRC was not required by the Oregon Fire Code. This 36-year gap in requirements, and the cost of installing ERRC systems in existing buildings, requires the fire code official to be cautious in requiring retroactive compliance with ERRC.

The fire code official must be prepared to demonstrate that a distinct hazard to life exists prior to applying the provision retroactively. If the fire code official pursues retroactive application, it shall apply only to the same scoping provisions as outlined in OFC Section 510.1.1, #1 through #5.

Question #3: ***Does the Office of State Fire Marshal (OSFM) have the authority to set standards for ERRC fire protection equipment requirements?***

Answer #3: **Yes.** The division of authority over fire and safety regulations between OSFM and Department of Consumer and Business Services, Building Codes Division (BCD) creates a split regulatory scheme for ERRC. ORS 476.030(1)(c) pertains to maintenance and regulation of structural fire safety features, and does not permit OSFM to require structural changes to buildings being built. However, subsection (d) permits adoption of rules to establish "Standards for equipment used for fire protection purposes…" "Fire protection equipment" means "any apparatus, machinery, or appliance intended for use by a fire service unit in fire prevention or suppression activities…" ORS 476.005(1). Providing radio coverage in a building for communication by a fire service unit requires system components and equipment to provide an ERRC system with sufficient radio strength as required by the OFC Section 510.4. OSFM has authority to set standards for ERRC equipment requirements under ORS 476.030(1)(d).

Question #4: ***Who has the authority to determine when ERRC is required?***

Answer #4: **The fire code official.** OSFM is authorized under ORS 476.030(1)(a) and (d) to adopt and enforce rules related to the requirements of buildings to have sufficient emergency responder radio coverage in buildings as described in the OFC. Whether radio coverage exists in a particular region, what frequencies can be accessed or must be used, or for what purposes those frequencies are to be used, are not elements of construction, and are under the authority of OSFM.

Once the fire code official determines that ERRC is required in a particular building, the OSSC sets forth requirements for elements related to construction and installation of equipment, and other structural components to the building.

Consequently, both OSFM and BCD have authority over certain portions of ERRC – OSFM sets standards for the necessity for radio communication coverage and how that coverage is to be provided; BCD sets standards for construction features and structural elements related to the installation of the ERRC system.

Question #5: ***Are all regulated buildings required to install ERRC equipment, such as a distributed antenna system (DAS)?***

Answer #5: **No**. OFC Section 510 requires only regulated buildings (see Question #1) to meet the signal strength requirements of OFC Section 510.4.1. If signal strength testing demonstrates a building inherently meets the signal strength criteria in OFC Section 510.4.1, no ERRC equipment needs to be installed. If a building does not meet the signal strength criteria, a radiating cable system, distributed antenna system, or other *approved* system or alternative shall be provided per OFC Section 510.4.2 to provide the minimum level of radio coverage.

Question #6: ***Does the OFC identify when signal strength testing needs to be completed?***

Answer #6: **No.** The OFC does not specify when testing must be done, but since coverage levels must be maintained, it is safest to do testing near full completion of the building after all exterior cladding, roofing, glazing, and interior partitions are in place. If testing is done too early, an owner runs the risk of having a building that passes the early test, but does not comply after it is fully completed. The fire code official should approve the timing of testing in conjunction with the FCC license holder.

Question #7: ***Are regulated buildings required to install infrastructure (conduit, access boxes, etc.) in case signal strength testing demonstrates inadequate coverage or if radio signal strengths fall below minimum levels in the future?***

Answer #7: **No**. OFC Section 510 does not require any equipment, including infrastructure, be installed unless a building has unacceptable coverage. However, because testing is not performed until a building is near completion, and adding an ERRC system can be very difficult and expensive if infrastructure was not put in place ahead of time, careful consideration should be given to this issue. Industry experts can be consulted in the early stages of design to help owners determine if a building is likely to have acceptable coverage and if proactive infrastructure installation makes sense.

Question #8: ***OFC Section 510.4.1 requires 95% performance in floor area coverage; however, there is a conflict in OFC Section 510.5.3, which requires 90% performance in floor area coverage. Which is correct?***

Answer #8: **OFC Section 510.5.3 is correct**. Buildings must have the minimum specified radio signal strength in 90% of floor areas.

Question #9: ***What is the minimum required signal strength into the building per OFC Section 510.4.1.1.?***

Answer #9: **The minimum signal strength is -95 dBm receivable within the building.** There was a typo in the correlation of the 2014 *Oregon Fire Code* in which the model code language was inadvertently changed to language reflecting -100 dBm strength out of the building. The Oregon change is incorrect; it is intended to be: "A minimum signal strength of -95 dBm shall be receivable within the building" as stated in the un-amended *International Fire Code* language.

Question #10: ***Does the minimum radio strength need to be measured at the agency's antennae port per OFC Section 510.4.1.1?***

Answer #10: **No.** The fire code official is authorized to allow the signal strength to be measured, calculated, or otherwise approved. The specific method should be clearly identified by the fire code official in the technical criteria document required per OFC Section 510.4.2.2.

Question #11: ***Is the fire code official required to provide a technical criteria document that includes necessary information for testing, designing, and approving ERRC?***

Answer #11: **Yes.** The fire code official must provide a technical criteria document per OFC Section 510.4.2.2. The fire code official is responsible for coordinating with the FCC license holder to include all license holder requirements, including the emergency radio frequency utilized in their jurisdiction.

Question #12: ***Is secondary power required for 24 hours of operation as specified in OFC Section 510.4.2.3?***

Answer #12: **Yes. A standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 hours.** The 24-hour value was selected to ensure the reliability of the signal boosters during long-term emergency operations such as a response to natural disasters where utility-supplied electrical power is disabled. There have been questions on this topic because related NFPA standards require different levels of secondary power. In this case, the adopted OFC has specific language which takes precedence over any national standard per OFC Section 102.7. Additionally, there is an editing error in the 2012 *International Fire Code* (IFC) *Commentary*, which incorrectly reflects the requirement from the 2009 IFC in the explanatory material. The explanatory material in the commentary is not adopted code language.

Question #13: ***Are NEMA 4-type waterproof cabinets required for battery systems per OFC Section 510.4.2?***

Answer #13: **Yes.** NEMA 4-type waterproof cabinets are required, unless otherwise approved. The installation of protective cabinetry (NEMA 4-type) is a construction component included in the survivability requirements in *Oregon Structural Specialty Code* (OSSC) Section 915.3 under the authority of Department of Consumer Business Services, Building Codes Division (BCD).

Question #14: ***What signals need to be monitored to comply with OFC 510.4.2.4?***

Answer #14: **The following supervisory signals shall be considered as meeting the requirements of OFC Section 510.4.2.4.**

(1) System and signal booster supervisory signals shall include the following:
- (a) Antenna malfunction
- (b) Signal booster failure
- (c) Low-battery capacity indication when 70 percent of the 24-hour operating capacity has been depleted.

(2) Power supply signals shall include the following for each signal booster:
- (a) Loss of normal AC power
- (b) Failure of battery charger

Question #15: ***Is the fire code official required to make emergency radios available for testing per OFC Section 510.5.?***

Answer #15: **Yes.** The fire code official must make available calibrated radios for testing per OFC Section 510.5.3; or clearly identify other acceptable methods for measuring signal strength.

Question #16: ***Are acceptance testing methods required to use delivered audio quality (DAQ) measurements per NFPA 72?***

Answer #16: **No.** The DAQ requirements are annex material in NFPA 72 and are not mandatory. Acceptance testing shall follow the requirements set forth in OFC Section 510.5.3.

Question #17: ***What is the maximum floor area size for testing purposes?***

Answer #17: **A maximum floor area size up to 128,000 sf should be allowed, to be further divided into 20 grids per OFC Section 510.5.3, unless otherwise approved by the fire code official.** Since the OFC does not provide parameters for maximum testing area size, the national standard (NFPA 72, 14.4.10) shall be considered as prima facie evidence of compliance per OFC Section 102.8. Fire code officials should not require smaller test areas in order to ensure consistent application across the state.

Question #18: ***When and how is OFC Section 510.1 Exception #1 for a wired communication system applied?***

Answer #18: **It must be applied jointly.** Where testing using the existing public safety communications system finds the signal strengths are not satisfactory, Section 510.1, Exception #1 allows for the alternative installation of a wired communication system in accordance with OFC/OSSC Section 907.2.13.2, which requires the wired system be designed in accordance with NFPA 72.

If a fire code official wishes to allow a wired system in lieu of ERRC, the fire code official *must* first recommend the exception and the building official *must* approve it. The building code official may *not* grant the exception without the fire code official first recommending it. When applying this exception, the concurrent approval of fire and building code officials is required.

Question #19: ***Similar to Question #18, who grants approval of a wired communication system under OFC/OSSC Section 907.2.13.2?***

Answer #19: **The fire code official.** OFC/OSSC Section 907.2.13.2 sets forth the construction requirements for installing a wired communications system when the fire code official has recommended it in lieu of an ERRC system, and the building official has subsequently approved it. OFC/OSSC Section 907.2.13.2 is not triggered, as discussed in Question #18, without the fire code official having recommended a wired system be used in lieu of an ERRC system.

Question #20: ***Is pathway survivability required for installed ERRC systems?***

Answer #20: **Yes.** Survivability is required for installed ERRC systems under OSSC proposed Permanent Rule. The proposed rulemaking hearing http://www.oregon.gov/bcd/laws-rules/Documents/rules/20171029-errc-tr.pdf occurred on September 19, 2017 to permanently amend OAR 918-460-0015 and adopted survivability requirements in OSSC Section 915.3.

Once the fire code official determines ERRC is required in a particular building, the OSSC sets forth requirements for elements related to construction for the installation of equipment and other structural components to the building. The cabinets and shaft enclosures, along with any wiring or other structural requirements to install ERRC, is under the authority of the BCD to regulate.

Conclusion: OSFM has authority to enforce statutes and adopt rules relating to fire prevention and standards for fire protection equipment. BCD has authority to regulate construction standards for buildings and other structures.

For purposes of regulating ERRC, this general division of authority results in both agencies playing separate, but complimentary roles in ensuring a complete regulatory scheme that provides ERRC to fire service units. OSFM, through the OFC, may adopt code provisions describing who is subject to ERRC requirements and what those requirements are. BCD, through the OSSC, may adopt code provisions describing how the ERRC equipment installation requirements are constructed and installed within a building, including the wiring components of ERRC.