



Most Innovative Design Award



Pikes Peak Summit Visitor Center

Colorado Springs, CO

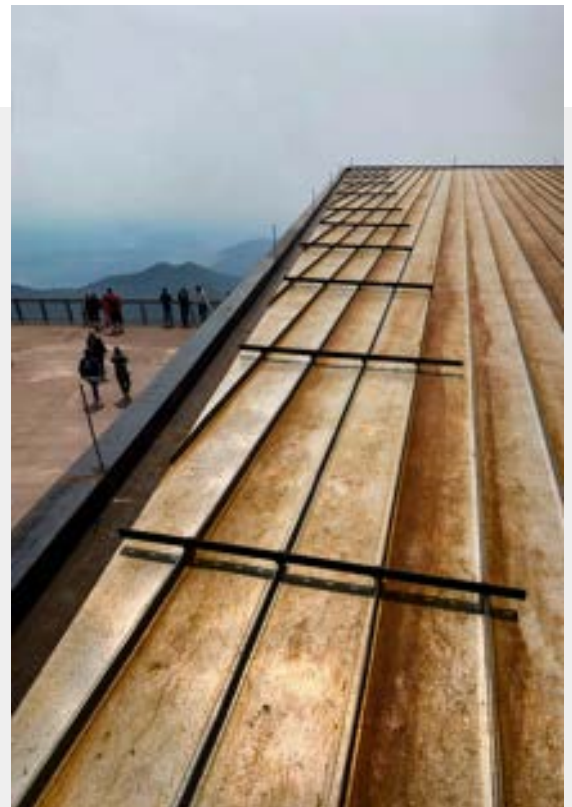
Photo courtesy of RTA Architects

The Pikes Peak Visitor Center, formerly the Summit House, stands at an altitude of 14,115 feet above sea level and can experience temperatures as low as -39 F degrees with snowfall even in the summer.

The Pikes Peak project is an excellent example of early coordination of people, processes, and materials. Input from several different fields and thorough assessment of the natural landscape, climate and building usage, lead to a design that is architecturally stunning and safe from lightning.

Michael Riggs
RTA Architects
Colorado Springs, CO
Architect and Interior Design Firm

Bret Peifer
Mr. Lightning
Colorado Springs, CO
LPI Member

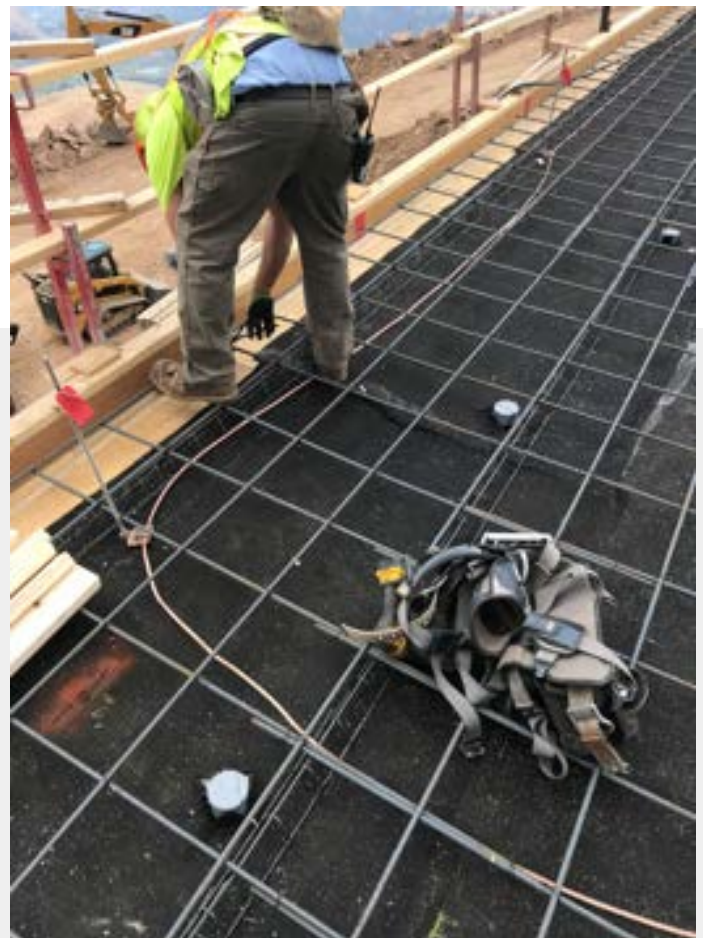


Credits: Mr. Lightning

Overcoming Challenges

The extreme temperatures, hurricane-force winds, and low soil conductivity created several challenges for the project team.

Exposed elements of the structure had to be hardened to withstand conditions. For example, exposed conductor cables were avoided wherever practical, air terminals bases were provided with extra-strong attachment to structure, and through-structure penetrations were minimized. Permanent metal fabrications – including railings and roof gutters made from steel plate – were used as strike termination devices and in lieu of conductor cables.



Credits: Mr. Lightning

Below: No through-roof penetrations were allowed on the standing seam roof. At the perimeter of the roof, a custom gutter and coping is made of steel plate to resist the harsh weather conditions and to be electrically continuous with the air terminals.



Credits: Mr. Lightning

Above: At rooftop terraces, conductor cables were covered with concrete topping slabs. Vertical threaded rods were attached to metal railings that serve as strike termination devices.

Overcoming Challenges

The Summit House is built on granite with a very low soil conductivity. This required aggressive measures to achieve satisfactory grounding. Techniques employed included ground loops, ground enhancing material, and welded connections.

The ground loop cable around the High Altitude Research Laboratory was embedded in ground enhancing material due to the low conductivity of the rocky soil. (Below)



Credits: Mr. Lightning



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The Summit House has both a ground loop and ground rods to overcome the low conductivity of the rocky soil. Because ground rods could not be driven in the rocky soil, they were installed at the base of excavations, then covered with backfill. The conductor cable hanging on the wall was concealed when wall cladding was installed. (Above)

Incorporating the System into the Structure

Starting the conversation early allows thoughtful consideration to integrating the system into walls and/or utilizing architectural elements as part of the system. All parties involved in the design process wanted a building that would honor the legacy of the Summit House yet not overwhelm the spectacular beauty of the mountaintop or the vistas that visitors experience. This influenced the design of the lightning protection system and the selection of materials used.

Below Left: Railings, made of weathering steel, are electrically continuous with the lightning protection system and used as strike termination devices.



Credits: Mr. Lightning

Above Right: Portions of the rooftop terrace are covered with stone to look like the natural mountaintop. The air terminals installed on the rock is made of copper to better match the rock.



Credits: Mr. Lightning

Right: The eastern face of the building rises out of the mountain's side to offer commanding views into the distance. The steel railing is used as a strike termination device. The slender air terminals reflect the light of the sky.



Credits: RTA Architects

Collaboration

The success of the project is the result of a multi-year long collaboration among project team members.



Credits: RTA Architects

According to Michael Riggs, “The lightning protection system was a challenge from the ground up. We worked with Mr. Lightning to understand the soil conductivity, find ways to route lightning conductors through the building, and understand requirements. Then we wrote a performance- based specification that allowed us flexibility so the details of the lightning protection system could continue to evolve as the structure took shape.” This was beneficial, Riggs says, “a lightning protection system has lots of components that require a thoughtful approach to integrate into a design and coordinate with other systems on the project.”

The project team’s commitment to creating a durable and safe building also included requiring the project to be inspected and certified by the **Lightning Protection Institute – Inspection Program**.

In Memory and Special Thanks for the written documentation of this project by Michael Chusid RA FCSI, LPI Member

About



The Lightning Protection Institute (LPI) is a national organization that leads the way in establishing the highest standards and guidelines for the design, installation, and inspection of lightning protection systems.

<https://lightning.org/>

Lightning Protection Institute – Inspection Program (LPI-IP) is the most comprehensive 3rd party inspection program for the lightning protection industry. <https://lpi-ip.com/>

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LPI Most Innovative Design Awards The purpose of the Innovation Awards is to provide recognition to LPI Members and an outside individual or firm for their collaboration on the design and installation of a lightning protection system. Awards are given to a person/firm that demonstrated early coordination with an LPI professional to design an innovative solution to improve the aesthetics of the lightning protection system on a noteworthy structure.