

Rock Solid House on the Hill

Jefferson County, Colorado is a place filled with magnificent wonders only nature can provide. Several years ago, Mike Hegdahl envisioned his home here perched high above a spectacular vista of forested valleys in a remote subdivision, just southwest of the Denver area. His plan was to build his 8400 square foot dream house on a spot close to the site's access road. However, after initial work began on the site in 2007, influence from the neighboring area pushed the site further from the road and out to the canyon's rocky edge which required a complete revamp of the home's foundation.

The redesign of the plan added even more difficulty to the project, requiring a construction team with extraordinary creativity, tenacity and vision. Keith Bleeker of Advantage Exteriors, from Colorado Springs was chosen as the ICF contractor. He is a gold certified Quad-Lock installer with extensive experience on difficult projects from earth-sheltered homes to masonry clad commercial buildings. John Hatfield of Energywise Sustainable Products, the Colorado Quad-Lock Distributor, brought 40 years of construction experience to the project and assisted Advantage Exteriors in working through the myriad of challenges the project presented.

The county required the owner to bury a 10,000 gallon water tank on the site, to combat fire fighting concerns in the remote forested area. This was quite a challenge in light of the numerous exposed granite outcroppings and steeply sloping property. Additionally, multiple propane storage tanks were required due to the roads being nearly impassible several months each year.

Blasting the rock to prepare for construction was not an option because of the proximity of neighboring homes and the steep terrain that would funnel debris downhill to structures below. The granite formations on the site were extremely hard, resisting and devouring jackhammer bits by the dozen. The project was further complicated when an overzealous excavator dug into natural rock resulting in an excavation that was over 15 feet deeper than planned in some areas. With some areas cut way too deep, and high spots being too hard to level off, level foundations for the home using traditional forming methods were impossible. Innovation and creativity were required.

On-site discussions between all parties generated a plan to use Fab-Form materials to customize a stepped foundation along the south foundation wall which dropped 15 feet in elevation. A pad footing was constructed within the rock outcrop using epoxy doweled rebar and fabric forming methods to create a base for a 10 foot tall column that would hold the corner of the main garage. The Quad-Lock wall materials were sculpted to the natural rock surface which tilted two different directions up to 20 inches within a 24 inch wall height change. In all areas where natural rock was used as support, vertical rebar was drilled and epoxy set in to the rock.



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The complex foundation and undulating rock surface required extensive customization of the Quad-LOCK panels, which included numerous changes in wall thickness and different support mechanisms for the panels on either side of the same wall. The ability to hand carve each Quad-LOCK panel was crucial to the success of this project. The commitment to excellence and quality by Advantage Exteriors in measuring, calculating, cutting, leveling and re-leveling the Quad-LOCK wall system as construction progressed was the key to an eventually successful outcome.



The multiple elevation changes and customized footings and pads created a series of challenging steel reinforcement and forming details. Drops in footing levels, as much as six feet, had created virtual “windows” in the foundation which generated another set of challenges during concrete placement.

Due to the raised floor level in the center of the building and the long narrow footprint of the building, the foundation corner points were not visible across the structure. This made dimension lines, plumb and level lines and point verification impossible. The house was constructed “blind” in three sections until all three areas were built up to a level where visual confirmation was possible. When the first floor was measured for parallel chord wood trusses and TJI's, the contractor was able to verify, for the first time, that all the walls and dimensions matched up. Needless to say it was a huge relief to find everything plumb, straight, square and level!

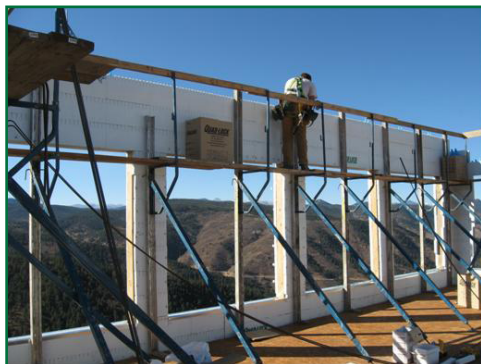


Another challenge for this project was the concrete delivery and placement. The closest batch plant is 18 miles away, and the slow climb to the site makes the travel time over an hour and fifteen minutes long. Advantage Exteriors decided to utilize a site-mix concrete company called 24/7 Site Mixed Concrete, who would load the individual components of the mixture into the separate bins of “volumetric trucks” and then combine them with water on-site. This allowed for slump adjustments to be made immediately, and concrete easily placed. If placement had to

be suspended temporarily while footers or walls were plumbed or straightened, the freshness of the concrete allowed for that time gap without concern for a too-quick set up of a partially poured wall. The site-mixed solution was extremely valuable to the overall success of the structure, resulting in walls that were plumb, straight, square and level.



The long narrow home has two large garages located on either end of the structure, one for family use and one to be used as a hobby center. The main floor includes the kitchen and dining areas, a “sun hall” and a large dramatic great room that overlooks the dizzying 2000 foot drop from cliff's edge and provides a breathtaking vista of mountains to the west. The second level contains several bedrooms and more spectacular views.



The construction of the main floor was relatively simple compared to the extraordinarily difficult foundation phase. The walls, which are twelve feet tall, have numerous large windows to utilize the abundance of natural light and capture the stunning views. They also provide support for the second story.

The second story of the home was designed with large gable ends which were a challenge to construct with the high winds at the site. At times it was difficult to keep the lightweight Quad-LOCK panels straight during stacking and concrete placement. Extra precautions for bracing and for worker safety were taken. The gabled end of the home rises forty-one feet above the ground with the second story encompassing

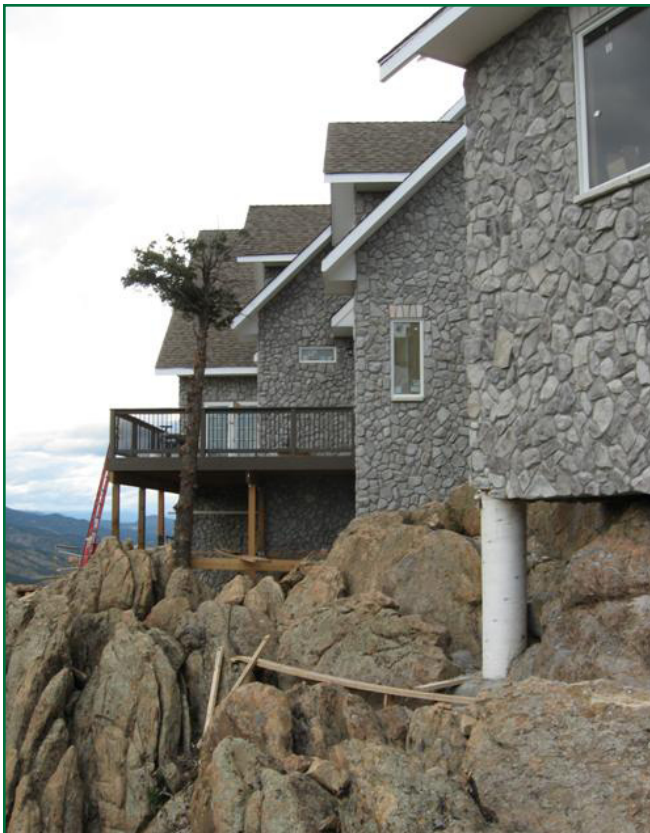
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the top nineteen feet. As that top gable was poured, stops had to be created within the wall so that the pump could continue to place concrete all the way up to the peak.

The owners wanted a distinctive finishing treatment for their dream home. Cultured light grey veneer stone, manufactured by H&M Stone of Greeley, CO was installed on the exterior of the home. The expanded wire mesh required underneath the stone was screwed into the Quad-Lock ties at twelve inch centers. The secured wire mesh allowed the light gray field stone to be securely attached to the walls up to 61 feet high.

The result after all the challenges and inventive solutions is a dramatic and enduring home that commands extraordinary views from inside and out.



Quad-Lock Insulating Concrete Forms ensured the success of this unique and challenging, one-of-a-kind project. Quad-Lock is a proven product that can be ADAPTED to ANY site and ANY condition.