

Access Roads:

the Key to Protecting Assets

By Del Williams



As industries from telecom and power to utilities and law enforcement require remote site access to maintain cell and microwave towers, power lines and the like, the low-cost repair and construction of these unpaved access roads is becoming vital.

Now telecom companies and others requiring cost effective, unpaved road repair or construction at remote sites are reducing their costs and project timelines by 50 percent or more with linear crushers, an innovative category of road construction equipment. They are also correcting their underlying subgrade problems, as well as meeting environmental restrictions with the same process.

Rapidly Regaining Telecom Road Access

The California Highway Patrol (CHP) and most law enforcement agencies as well as fire and rescue services use microwave towers to communicate with patrol cars in the field. This allows CHP to send a signal from their headquarters in Sacramento to any car in the state at a moments notice. But this requires tow-

ers to be spread across vast, remote areas including deserts and mountaintops, far from highly populated coastal areas.

So when a heavy rainstorm recently washed out part of a gravel road required to access a new CHP communications tower project on a Mojave Desert mountaintop, the question was how to quickly and cost effectively rehabilitate the access road so the project could be completed.

Ned Araujo, P.E., a Senior Associate at Stantec, a professional design and engineering consulting firm, was brought in to help.

"After the washout damage, the access road was unsafe to travel even by four-wheel drive," says Araujo. He relates that the steep, mountain road gains about 1,000 feet of elevation in about 2 miles, with an average slope of about 9.5 percent, but with some segments that exceed 20 percent of slope.

According to Araujo, the option of using a nearby pit or quarry to source material for reconstructing the road was immediately discarded due to a lengthy environmental permitting process, com-

plicated by the presence of a protected desert tortoise in the area.

The option of reconstructing the road using an imported road base material was also rejected due the high cost of purchase, transport, and the challenge of removing the rocks and boulders that were exposed at the roadway surface to prepare the subgrade for the imported base material.

Araujo says that covering the road

surface with crushed rock from the tower foundation spoils without properly mixed fines would have made the situation worse. "Spinning truck tires would have scattered the crushed rock, rain would wash remaining fines away, and subgrade issues like protruding rock would remain unaddressed," he says.

Costly Traditional Road Repair

The traditional gravel road repair approach is ill suited for the remote sites that telecom, cell and microwave tower, and power line technicians must access. The process typically involves removing large rocks and burying any road subgrade problems, such as ruts, potholes, and protruding rock. But purchasing excess commercial gravel and burying these road issues is costly, particularly when it must be trucked long distances. It also leaves the underlying subgrade problems, which can quickly resurface.

In such cases, buying and hauling gravel usually accounts for about half of the road repair project cost. The price rises when road widening, as well as turnout or turnaround creation is needed to accommodate the string of trucks bringing gravel.

Another approach, sourcing the fill material from a local rock pit or developing one, is also expensive. Even when local pit development is not prohibited by environmental regulations, it can be costly to get a portable or mobile crusher into a local pit. If pit permitting and development is required, the lengthy process can be cost prohibitive.





Building the Best Telecom Road for the Dollar

Portable and mobile crushers have significant logistical drawbacks for remote telecom road repair. Portable crushers are mounted on wheels for portability but are stationary when in operation. Mobile crushers are mounted on tracks for mobility around a pit. A mobile crusher could be walked down a road to process material, but would require an army of equipment to achieve this.

Linear crushers, however, need only a minimal set of equipment because they move along the road being repaired, crushing oversize rock along its path in a crushing chamber. This can speed remote access road repair or construction for telecom companies.

Linear crushers reduce the cost per mile of remote road construction while rehabilitating unpaved roads by crushing existing rock – typically found in the road subgrade, ditches or berms – into a quality gravel road surface.

Since the machines crush rock onsite, vehicle operators can get right to work reducing oversize with their equipment. In contrast, when rehabilitating a road with trucked in material, operators are largely idle until the material arrives.

“Gravel road repair with a Vanway linear crusher took half the time at half the estimated cost of hauling in fill material,” says Dwayne Wallace, Project Manager at SFM Constructors, an engineering, construction, and design-build contractor that recently served as general contractor on the California Highway Patrol



communications tower project.

Vanway International an innovative crusher manufacture, makes linear crushers with the versatility to make engineered performance crushed stone products in a diverse range of locations and from a large variety of rocks. This includes construction grade rock (less than 110 MPa unconfined compressive strength) such as trap rock, quartzite, granite, and dense limestone.

In such linear crushers, the oversized rock, existing gravel/crushed rock, and natural fines are all windrowed together and processed through the crusher in one

pass, which leaves the reduced material in place as a stable crushed layer. When used in on-road repair, it can help achieve “aggregate lock”, a natural binding of soil and gravel when wet. This can prolong the life of the road surface beyond that of cleaner gravel from a pit that typically lacks soil mixed in as a binding agent.

“The Vanway linear crusher, operated by our road subcontractor Roadtech, offered the best road quality at the lowest cost,” says Araujo.

To rehabilitate the communications tower access road, the road subcontractor operated the linear crusher in con-

junction several other pieces of equipment including a rock hammer, grader, roller, and water truck.

According to the subcontractor, about 1,000 cubic yards per lane mile of onsite material was crushed and mixed with fines into usable road surface in the process.

An environmental representative monitored the onsite road development process, according to the subcontractor, to ensure it met environmental guidelines and did not harm any protected species, such as the desert tortoise.

“With the Vanway linear crusher as part of the operation, we were able to use onsite road foundation and related material that needed to be disposed of, and crush it in place into road base material mixed with suitable fines,” says Araujo.

In contrast, hauling in road fill material by truck would have used perhaps a dozen or more pieces of equipment including a grader, roller, water truck, truck loader, and five to 20 trucks to transport the fill material depending on how far the haul distance.

“Road improvement that uses onsite materials is not only cost effective but also environmentally friendly,” says Araujo. “It is a best practice technique for telecom companies and others requiring remote access road repair.”

According to Araujo, using onsite materials avoids the need to truck in an enormous amount of offsite road base material. “It also preserves the natural setting by using native materials, converted from construction debris into quality roadway surface,” he says.

The rapid rehabilitation of the washed out access road allowed the communications tower to be built without further delay.

Ken Keating, P.E., Stantec Senior Electrical Engineer, and Project Manager for the communications tower project, says, “The linear crusher improved a rough four-wheel drive road into an excellent two-wheel drive gravel road that allows easy site access.”

Araujo is planning to use the linear crusher in an upcoming remote site project with a steep incline that is difficult for construction vehicles to climb. But he feels that its use should not be limited to quick response road repair.

“Whenever new gravel road construction or reconstruction is needed at remote sites, I look at using a linear crusher as a first option, particularly in environmentally sensitive areas,” concludes Araujo.

For more information on Vanway crusher

