



Understanding Gravel Roofs



Have you ever wondered why they installed them? Then, how to restore them?

Let's go back to the earliest forms of roofing in the early 1900's with "Built Up" roofing. Which consisted of melted asphalt, with layers of reinforcement, (felt). They chopped up old rags and made it into paper. And that paper was then saturated with a form of asphalt, then they would layer the hot asphalt and felt. Hence the built-up roofing name or BUR.

Eventually fiberglass displaced the organic felts. Using the same principle, they "built up" a roof in, in two layers, three layers, four layers, but they needed something to surface it with. The gravel or rock roof was born.

Is your building a candidate for a roof restoration?



Early applicators had two problems with surfacing a roof.

One was the UV degradation in some parts of the country. They just top coated the roofs with asphalt, very hot and thin, and put in every two or three years, just like they do a driveway. Essentially, they would put another coat of asphalt on it, leave it black and let it weather. But that brought up other problems with big fires.

Various government entities decided to establish fire ratings. Underwriters Laboratories, and other testing companies started testing roofs for their liability. Now we need roofs that won't burn, and ideally even help against fire as certain forms of asphalt can burn readily. Somehow, we needed those roofs to have some fire and UV resistance. In parts of the country where we have a lot of direct sunlight that asphalt will oxidize away in the direct UV sunlight.

The solution was simple. There is one thing available that is almost universal around the country and that is gravel and rock. Whether you are in Maine, Florida, Ohio, Oklahoma, California, or Washington. You can get gravel, and gravel does three things.

Number one, gravel, or rock adds a little bit of weight to the roof for wind resistance.

Second, it adds a UV resistance because the sun can't penetrate it. It doesn't keep the temperature cool, but the UVs are not going to degrade the asphalt.

And third, it is fire resistant. If you put enough gravel on a roof, you can get a fire rating with a paper towel! In addition, it is a terrific barrier to the heat.



Gravel did a great job.

The proof is in the many roofs all over the country that were done with gravel. Not to be confused with granules, granules are something very small that they put on a cap sheet in the factory, but it does the same thing gravel does. It's a UV barrier and a fire barrier. And those are still common today in modified bitumen and granularized rolled roofing.

With all the gravel roofs nationwide, the challenge arises of re-roofing. Instead of the expensive remove and replace option, we needed to come up with a way to restore the gravel roof.

Coatings were not readily considered as an answer to a gravel roof. As with granulated rolls and single ply's they are smooth. A coating could be easily applied, but what do we do with this gravel roof?

Rock and Gravel has a very rough surface texture because a good portion of the gravel has to be, by the specification, embedded in the asphalt.

Applicators put on that layer of asphalt, then a layer of gravel that is uniformly embedded into that asphalt that doesn't come off very easy. And you wanted that to be on there. That was important part of a gravel roof, but it made repairs difficult.



Gravel roof restorations started to gain traction about 40 years ago.

Companies like Tremco, leaders in the coating industry, and Garland Company had products that they used on gravel roofs. Those were originally solvent base. Essentially what the early adapters did they did was to go over that gravel roof that was all dried out and cracking and put this solvent-based asphalt product on it that would lay on there in a very thick layer, and the solvents would migrate down into the old asphalt and soften it up. They had a lot of success for, for some years, but the number of solvents that were used with time made that not very desirable as they dried out and they tended to crack again.

Over 50 years ago Western Colloid figured out how to successfully restore gravel roofs, and that's because we make **Asphalt Emulsion**. And an asphalt emulsion is an asphalt that isn't readily flammable. Plus, it is relatively inexpensive, so higher quantities are not cost prohibitive.

If you were to use acrylics to build up the roof, or a plural component like some products, it would be very expensive because by the time you covered the gravel to fill in the voids and smooth out the roughness you would have a very expensive roof with a lot of gallons applied.

Asphalt emulsion is a combination of a straight run distilled asphalt. When it is mechanically ground with a bentonite clay and water it becomes a colloidal product, (which hence the "Colloid" in our name.) Once the water evaporates, it's a combination of bentonite clay and asphalt. And that results in two things, it's very waterproof and it's a low-cost product. Also, it has none of the traditional asphalt fumes.



Emulsion can be challenging as far as estimating the amount needed.

We have specifications, but even our specifications vary depending on the varied gravel sizes used in different parts of the country.

As a rule, most of our gravel roof specifications end up using between a minimum of 18 gallons to 30 gallons of emulsion per 100 square feet.

Contractors say, "How much weight am I putting up there?" Think of it this way, you just took off 200 pounds of loose gravel and you are going to put back on 40 pounds of emulsion. You will not be even close to what you took off when you cleaned off the gravel.

Another thing to keep in mind is in estimating asphalt emulsion on a roof is that it is between 40 and 45% solids. It's not high solids product, which means 55% of that evaporates away as water. It leaves less than half of the volume. When you spray on three eighths of an inch thick it will dry to one eighth of an inch thick. You must keep that in mind that you are putting on a lot more than what you think. In a water-based system water must evaporate and that roof must dry and cure.

You should never install only one reinforcement ply over a gravel roof. This isn't a band aid roof. This is a substantial reinforced coating system. It does take some training. Western Colloid has even helped other manufacturers develop their specifications.

After the emulsion flood coat, the emulsion is dried out and then at least two ply's of polyester fabric with asphalt emulsion and one ply in acrylic #720 Elastahyde, depending on drainage and what part of the country. Then the acrylic topcoat.



For the topcoats on these gravel projects, we chose acrylics 50 years ago and it still works today.

A great example of this solution is a very large, well-known building, that was done with a combination of a flood coated gravel roof that was a chopped glass and emulsion with additional plies of polyester and emulsion, finished with polyester and acrylic on top.

This high profile building saved close to a million dollars as it had a heavy insulation on it along with the gravel roof. If they had to tear off the entire roof with the insulation and re-install another product it would have been a very costly roof.

On a side note, the roof on that same building in the Dallas area withstood a huge hailstorm that came through with five-inch hail. Western Colloid's specification and products came through with flying colors.

Our gravel roof specifications like those mentioned above have FM ratings, both with chopped fiberglass reinforcement and polyester reinforcement over gravel for successful hail tests.

If you have a gravel roof project coming up Western Colloid has a terrific solution to avoid tearing the roof off. In addition to the savings mentioned above we can help to provide a renewable, sustainable, highly reflective roof system for that building and that building owner, which will bring down energy costs, heating and cooling costs.



Frito-Lay Corporate Headquarters

Roofing Contractor: Unified Commercial, Baton Rouge, LA

Job Location: Plano, Texas

Size: 140,000 Square Feet

Objective:

Original roof assembly: concrete deck, 2-1/2 inches rigid insulation, coal-tar and gravel, and BUR and gravel roof assemblies.

Existing roof assembly approximately 32 years in age. Experiencing base flashing problems and splitting of the field membrane causing water infiltration into the corporate headquarters building which houses 3,800 employees. Originally, Frito-Lay wanted to completely remove the existing gravel coal-tar & BUR roof assemblies and install an energy efficient TPO roof assembly. The disruption to the building occupants, grounds and controlling of dust and debris from entering the beautiful lake, which goes underneath the facility along with the cost of 2 million dollars made this prohibitive.

Specs

Western Colloid presented a customized specification that would eliminate the removal of the existing roof assemblies and save Frito-Lay over one (1) million dollars. The Western Colloid specification allowed the contractor to remove the loose gravel, apply a flood coat of asphalt emulsion with glass embedded into it. Then an additional pass of emulsion with a ply of tough polyester fabric embedded. Once cured, the system was surfaced with Western Colloid's ElastaHyde acrylic coating reinforced with an additional ply of polyester fabric. Western Colloid SWS850 Seamless walkways were installed as a OSHA warning line ten (10) foot from the edge along the 4,000 LF of the four story, which does not have a parapet.

Results

The Western Colloid system achieved the reflective, energy saving roof assembly that Frito-Lay wanted and also provided them additional savings in the form of tax benefits.



Cypress Office Building

Roofing Contractor: Bligh Pacific Roofing, Los Angeles, California

Job Location: Cypress, California

Size: 225 squares

Original Substrate: BUR with Gravel

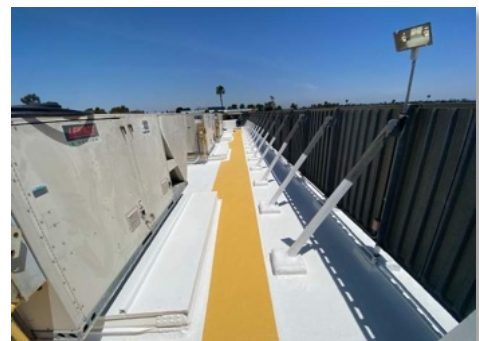
As time marches on for our 50-year-old company, Western Colloid is now involved in roof 'reconditioning' projects more and more.

In 2009 Bligh Pacific Roofing in Southern California was tasked with reroofing a gravel roof on a 2-story office building. There was a big concern by the owner to install a roof that would not disturb the sensitive building occupants.

Rather than removing the roof entirely they trusted Western Colloid's products to be able to work over a rough surface and provide a new cool roof with a 10-year warranty. All while installing a roof safely with little to no inconvenience for the tenants. They removed the loose gravel exposing the rough surface below and proceeded with an emulsion, 2 ply polyester and acrylic topcoat system which is ideal for these kinds of situations. Bligh Pacific completed this quality project with very happy clients.

Here comes the time marching on part. 12 years later Bligh Pacific Roofing was asked to comeback and recondition this well-maintained roof. They recently renewed the roof system with a one ply reinforced acrylic specification which gives them an additional 10 years. Plus, they took advantage of our 850 SWS Walkway coatings for additional protection.

This roof is a shining example of extending the life of your roof. With a little attention and the right products (Western Colloid!) this roof can be extended indefinitely.



Alhambra Police Department

Roofing Contractor: Best Roofing

Job Location: Alhambra, California

Original Assembly: Rock/Gravel Roof over BUR

Objective:

This Southern California Police station came with its own set of challenges. This project was a Western Colloid specified roof using our GR-2P-24-XE Specification, but the most challenging aspect was the bidding process in the middle of the covid restrictions. Our Training and Technical Consultant, Tim Ford, conducted the inspections and recommendations with 15 different contracting groups.

This roof had a gravel surface. The loose gravel had to be removed, surface cleaned, and then fill-leveled with our #298 Asphalt Emulsion to fill in the irregular voids left by the rocks. **This is the most important step of a gravel roof restoration.**

By filling the voids you create a smoother surface giving us great adhesion. On this project a coating of 9 to 12 gallons per square was used. Then 2 ply's of polyester fabric and the emulsion topped by our #720 ElastaHyde Acrylic Roof coating.

The biggest challenge was a giant water tower on the roof that was constantly leaking underneath it. The roof area beneath it was destroyed. That area had to be repaired and a new roof installed to be protected from the constant dampness. The next step was to prevent new damage.

Tim and the Best Contracting team came up with a plan. They had an 8 x 10 foot sheet metal pan fabricated and added a PVC drainpipe leading to a roof drain there by avoiding the problems on the past roof.

It was a long process to get this roof from bid to completion but the ingenuity by our team and Best Roofing protected this important building with a new 10-year warranty and a roof system they can believe in.



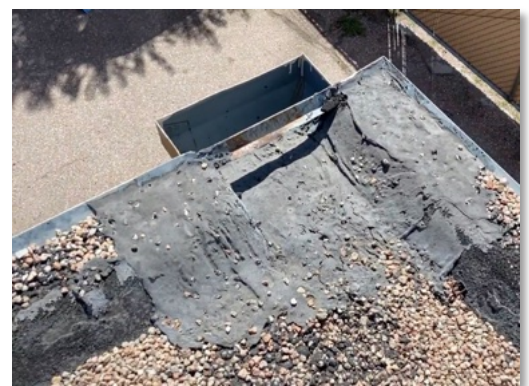
Inspecting Your Gravel Roof

Your team or a contractor should inspect your roof at least once a year. Inspections following extreme weather events are also a good idea.

As part of your checklist, make sure you do the following:

- Identify any new owner/tenant improvements since the last inspection, and check that flashings and tie-ins were done properly.
- Look for areas where the gravel cover is missing or is thin; these are more prone to damage.
- Check for poor drainage from coolers, condensers and air conditioning units. Install overflow control and piping as needed.
- Clean leaves, dirt and debris from valleys and waterways.
- Inspect drains, scuppers, overflows, gutters and downspouts for blockage. Clean as needed. Install or replace proper baskets and strainers as needed.
- Assess all roof penetrations, vents, pipes and flashings for cracks, and reseal as needed using Western Colloid Elastic Cement.
- Check all curbs, base flashings and wall terminations, and reseal as necessary with Western Colloid Elastic Cement.

Depending on the amount of any damage, your staff may be able to make repairs themselves, or you may have to hire a qualified contractor. In either case, make sure your roof inspections are documented, including photos, so that the roof condition is on record, in case of damage by other trades throughout the year.

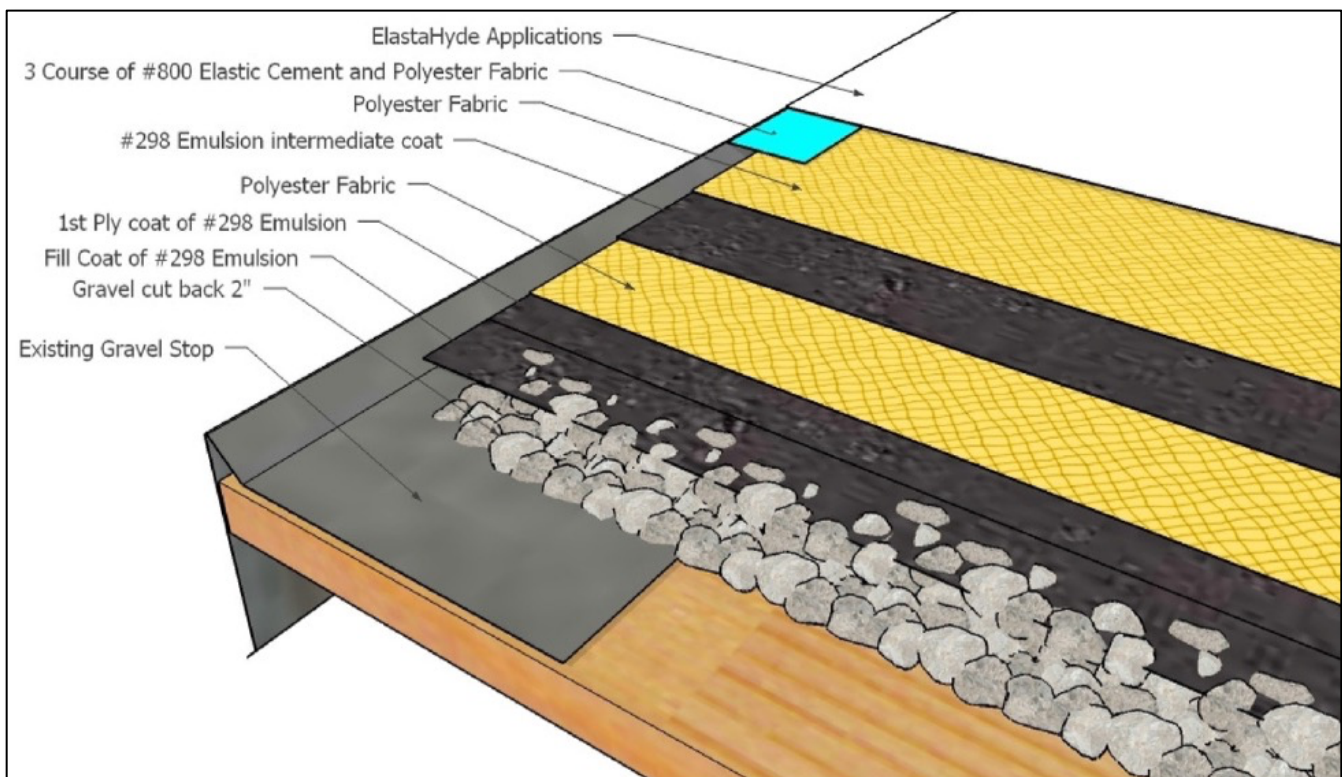


Replacing Your Gravel Roof

If you need to replace your gravel roof a complete tear off and replacement of the entire roofing system can be an expensive option. A more cost-effective option might be to restore the entire roof using a Fluid Applied Reinforced Roofing system. Fluid Applied Reinforced Roof systems with asphalt emulsion bases extend the life of existing gravel roofs.

This method includes the following general steps:

- Remove all loose gravel, dirt, dust & debris by vacuum and power brooming and blowing.
- Repair roof area as need. Including existing blisters, splits, pipe penetrations, terminations, flashings, drains, and scuppers.
- Apply fill coat of 298 emulsion as needed.
- Next, apply 298 asphalt emulsion with 1 ply of polyester fabric over entire roof area to build a tough flexible membrane.
- Apply a second coat of 298 asphalt emulsion with another 1 ply of polyester fabric over entire roof area to build a tough flexible membrane.
- Topcoat with Acrylic #720 Elastahyde.



Consider Western Colloid

When you combine Emulsion's waterproofing properties with strength of a polyester membrane, high emissivity, and reflectivity of the energy efficient acrylic topcoats, such as Western Colloid's #720 ARC ElastaHyde, the systems will also improve your building's energy efficiency.

Most of the Western Colloid asphalt emulsion-based systems have FM 4470 Class 1 approvals, and a Class A Fire Rating ensuring that these systems have been tested by the highest standards for durability. There are many advantages to using asphalt emulsion systems.

In Summary:

- *It's economical, which means you can build it up to the correct thickness you need without wasting extra money.*
- *It's a water-based system, so you don't have to worry about fumes disrupting your tenants.*
- *It's seamless, tough and flexible.*
- *It can be used to repair your gravel or rock roof without having to tear it off, causing major disruptions to your tenants and business.*
- *Fluid applied monolithic membrane means there are no seams and water cannot travel underneath it.*
- *It comes with renewable manufacturer warranties.*
- *It will last longer than your original roof and is able to be upgraded indefinitely, so you never have to worry about needing to tear-off your existing roof.*
- *With energy-saving reflective coatings the systems will meet and exceed LEED requirements.*

If you are looking to extend the life of your existing gravel roof (or other substrates) an asphalt emulsion fluid applied reinforced system has many proven benefits.

**Contact
Western
Colloid
Today
To
Learn
More!**





800-464-8292 • WesternColloid.com

