

Asphalt or Concrete Pavements: Which is Right for You? Neither. Terra Pave: Eco-Friendly, Cost-Effective & Superior Solution

If you're building a new pavement or fixing an existing pavement, using the right material is essential. For pavements, there are two essential paving materials to choose from: concrete and asphalt. The first question many ask is: "What is the difference between an asphalt vs concrete pavements? Instead, what people should ask is "How does asphalt and concrete pavements affect climate change and the environment? And "Is there better solution for cost, eco-friendly and superior in quality?"

Though these materials vary in many ways, they also have some similarities. First, both asphalt and concrete have a gravel base. They are both made with stone and sand (aggregates). The primary difference involves their adhesive materials. Asphalt is petroleum-based while concrete is made of cement. Both are toxic to the environment and a major cause of climate change.

For more information See 1. <https://www.bbc.com/news/science-environment-46455844>.

Concrete is the most widely used man-made material in existence. It is second only to water as the most-consumed resource on the planet. But, while cement - the key ingredient in concrete - has shaped much of our built environment, it also has a massive carbon footprint. Cement is the source of about 8% of the world's carbon dioxide (CO₂) emissions, according to think tank *Chatham House*.¹

If the cement industry were a country, it would be the third largest emitter in the world - behind China and the US. It contributes more CO₂ than aviation fuel (2.5%) and is not far behind the global agriculture business (12%). Cement manufacture for concrete contributes greenhouse gases both directly through the production of carbon dioxide when calcium carbonate is thermally decomposed, producing lime and carbon dioxide, and also through the use of energy, particularly from the combustion of fossil fuels.¹

Many workers are exposed to fumes from asphalt, AEP/MC-30, a petroleum hydrocarbon-based product used extensively in road paving, roofing, siding, and concrete work. Also, hydrocarbon-based products contain chemicals not friendly to the soil and which impact stormwater runoff. When hot asphalt and AEP/MC-30 are applied in a molten state, it generates toxic fumes. Workers exposed to these fumes are at risk of developing headaches, rashes, cough, and possibly cancer. There is no OSHA standard for asphalt fumes.

This simple variance leads to a variety of differences between the materials. Here are five ways asphalt, concrete and TerraPave pavements differ.

1. Cost

The cost of an asphalt pavement is typically cheaper than concrete, costing \$4.50 – \$6.00 per square foot. Asphalt prices tend to fluctuate with fluctuations in crude oil prices. In contrast, a concrete pavement costs between \$5.00 – \$8.00 per square foot for a standard installation. Finishes, details and stains can increase the price tag to as much as \$15.00 per square foot. **The cost of a Terra Pave pavement is typically less expensive than asphalt, costing below < \$5.00 per square foot.**

2. Maintenance and Repairs

When you consider an asphalt pavement, you should understand the maintenance and repairs that accompany it. Generally, six months to a year after installation, [an asphalt pavement should be sealed](#)—and then sealed again every two to five years.

However, concrete driveways don't require as much sealing. Applying a seal to concrete pavement will enhance the look and preserve the finish, so many owners opt for this maintenance. Degreasers increase maintenance

costs for concrete driveways, but they are often a necessary step to remove oil, fuel and chemical stains that build up over time.

Cracks affect both asphalt and concrete driveways and should always be repaired. Owners will find that asphalt cracks are easier to fix and result in more aesthetically pleasing repairs. While concrete cracks, on the other hand, are harder to repair and impossible to resurface.

TerraPave Top Seal products (TS) are used as a superior replacement of climate-wrecking concrete and toxic asphalt pavements. It is anticipated the cost of the products will be less expensive than existing materials today. There is 0% CO2 emission and it is 100% eco-friendly (non-toxic, non-corrosive, non-petroleum). The TS layer is waterproof, 3x stronger and 4x more flexible than cement stabilization.

3. Lifespan and Durability

Overall, asphalt is less durable than concrete. With proper maintenance, it can last 30 years. Alternatively, concrete provides a sturdy, long-lasting option and can last homeowners 50+ years with occasional repairs and degreasing. All pavements with traffics will require maintenance. In comparison, TerraPave pavements require very little maintenance and can essentially last forever.

4. Aesthetic and Design

When it comes to the look of your pavement, pavement material plays an important role. You can stain, tint, etch or stamp a concrete pavement to get a desired look. Finishes provide alternative colors or hues to the natural off-white, grayish color of concrete.

Asphalt, however, must be rolled and compressed during installation. It does not lend itself well to finishes, stamping or etching. Some sealants contain tints or coloring, but options are generally limited to black.

Using TerraPave White makes the pavement the color of the soil/aggregates and using TerraPave Black/TS Fog makes it an identical black color to asphalt pavement.

5. Climate and Weather

Owners living in very cold or hot regions should consider how climate and weather patterns affect their pavement decisions. In cold winters, concrete may crack from constant freezing and thawing, while road salt eats away at concrete surfaces. Hot climates affect asphalt driveways in negative ways, as well. Asphalt softens in the hot sun and can stick to shoes, clothing and car tires. Terra Pave pavements are not affected by the climate hot or cold, weather and will not crack or develop pot holes.

To recap, the differences between asphalt, concrete and TerraPave are many. Here are a few takeaways to remember as you continue to make the best decision for your needs, wants and budget:

Characteristics of an Asphalt Pavement

- Asphalt is less expensive than concrete
- Asphalt is a softer material, leading it to deteriorate faster and easier than concrete repairs.
- With proper maintenance every 2-3 years, expensive repairs can be avoided.
- It does not have the creative design aspect that concrete does, but recent developments now allow asphalt to be mixed with coloring or be sealed with color tints which increase the costs.
- Asphalt offers 30+ years of use however with lots of maintenance due to weather and traffic.
- Asphalt requires occasional resurfacing and resealing every two to five years depending on location, weather and traffics, which can be costly.
- Although it requires more often costly maintenance, asphalt repairs are easier than concrete
- Asphalt is toxic for humans, and the environment. Due to its petroleum-based and the use of AEP/MC-30 for the middle moisture proofing layer. AEP/MC-30 poses serious health risks to those

exposed to its fumes and potential flammability. The inhalation of asphalt fumes produced by petroleum solvents can cause dizziness, headaches, intoxication and vomiting. These fumes also contain known carcinogens. Carcinogens can cause cancer by changing a cell's DNA or causing cells to divide at a faster rate.

- MC-30/AEP products are laden with 50% kerosene, a toxin, whose leaching and evaporation into the ground and atmosphere have polluted the environment for years.
- Installation time from start to finish can be more than 1 months for traffics.

Characteristics of a Concrete Pavement:

- Concrete is more durable than asphalt.
- Because it is a less flexible material, it cracks in freezing temperatures, and many people turn to concrete patching products.
- Concrete offers 50+ years of use however most expensive and a major contribution to climate change.
- The only maintenance required is occasional degreasing.
- Resurfacing a concrete pavements offers more opportunities for creative appearance. It can be stamped with patterns, tinted to different colors, given different finishes, or engraved with designs.
- Though it is more durable than asphalt, when damages do occur, concrete repair is harder and costlier than asphalt repair. Weather and vehicle traffic are major contributors to concrete damages.
- An extremely large contributor to the problem climate change.
- Installation time from start to traffic able can be weeks

Characteristics of a TerraPave Pavement:

- TerraPave is more durable than both asphalt and concrete and less expensive than asphalt.
- Because it is a flexible water-proof material, there is no risk of cracks and potholes from freezing temperatures,
- With very little maintenance, TerraPave pavement can last forever.
- The only maintenance required is a spray of another coat of TerraPave product on the surface due to vehicle traffics.
- Like concrete TerraPave pavement can be stamped with patterns, tinted to different colors, given different finishes, or engraved with designs.
- It is more durable overall, but wear do occur, TerraPave is very easy to repair.
- TerraPave is 100% eco-friendly.
- TerraPave White and Albedo products can help ground mount solar farm projects eliminate vegetation, control dust, maximize production of bi-facial solar panels. This is due to TerraPave Albedo mimicking snow and reflect sunlight.
- Installation time from start to traffic-able can be as little as 4 days.

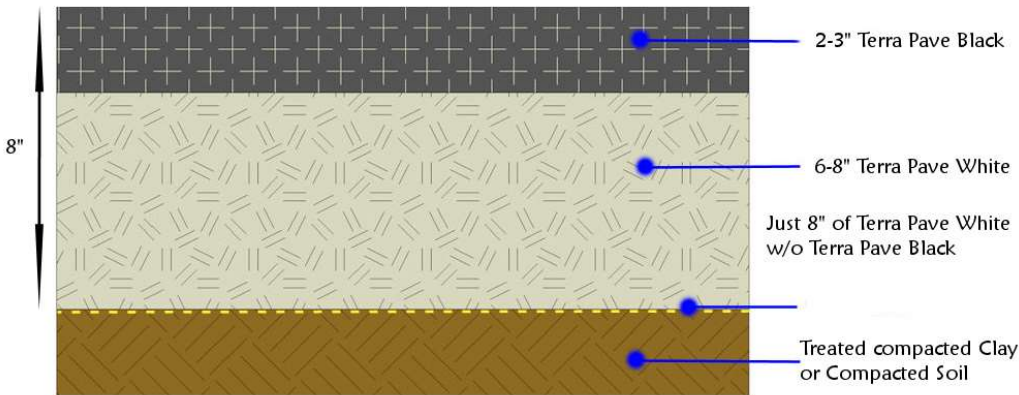
Conclusion

If you're looking for a pavement that is a lower investment cost-effective, eco-friendly and extremely durable and customizable, **TerraPave is the obvious choice**. TerraPave is perfect for owners that look ahead in the future and want their pavement projects to last indefinitely. TerraPave owners are positively contributing to the reduction of climate change and ultimately a healthier planet.



Comparison of Terra Pave Product spray on 8" of road aggregate vs. Asphalt & Concrete

8" TPWhite or 8" TPWhite/Black



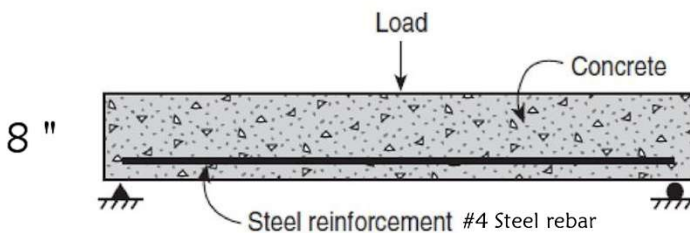
2-inch layer of a 12.5 mm well-graded wearing surface
3-inch layer of a 12.5 mm well-graded asphalt binder layer with a finer aggregate blend
4-inch layer of a 25 mm well-graded intermediate asphalt layer
4-inch layer of a 25 mm well-graded intermediate asphalt layer
3-inch layer of a 25 mm well-graded asphalt base layer

ASPHALT STRUCTURE

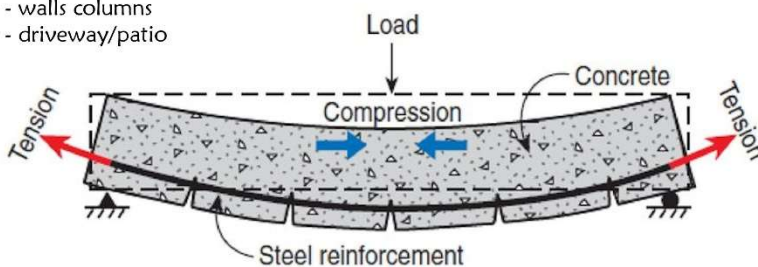


Different Asphalt Mixtures in the Pavement Structure

Why Use Reinforcement in Concrete?



- #5 rebar - footers and foundation
- #4 rebar - walls columns
- #3 rebar - driveway/patio



CONCRETE STRUCTURE





TERRA PAVE PRODUCTS TPW & TPB Climate Wrecking Concrete/Cement, Toxic Asphalt Replacements



- ✓ NON-HAZADOUS
- ✓ NON-PETROLEUM BASED
- ✓ NON-TOXIC
- ✓ NON-CORROSIVE
- ✓ WATERPROOF
- ✓ IMPROVES BRAKING DISTANCE
- ✓ EROSION RESISTANCE
- ✓ NO SPECIAL HANDLING PROCEDURE
- ✓ NO SPECIAL EQUIPMENT NEEDED

TERRA PAVE WHITE AND ALBEDO FOR SOLAR FARMS AND BI-FACIAL SOLAR FARM PROJECTS



Videos and Related Medias

Terra Pave product eco-friendly test at Sandia National Laboratories:

<http://www.ecoestates.us/terrapave/sandia.pdf>

Terra Pave products video : <https://youtu.be/4449TZvtCdU>

Terra Pave White project in Chile : <https://youtu.be/yYqVTOmPjgs>

Terra Pave White project with ExxonMobile : <https://vimeo.com/377598222> see below for more

Terra Pave White project in Mexico : <https://youtu.be/CWpfQ0I7g74>

Terra Pave White + Black project in South Africa : <https://youtu.be/IiYNjLaXj9c>

Terra Pave Top Seal Fog projects with City of Austin, TX USA : <https://youtu.be/XJTIFs-v92I>

Terra Pave White and Albedo won semifinalist in the Department of Energy DoE American-Made Solar Prize at the National Renewable Energy Laboratories : <http://www.ecoestates.us/terrapave/nrel1.pdf> and <https://americanmadechallenges.org/solarprize/round2.html>

Terra Pave team was invited to Lisbon Portugal by EDP Renewable for the WEB SUMMIT 2021:

<https://youtu.be/EDz9zTpS Js>

Terra Pave products in the medias: (there are many more medias for Terra Pave products)

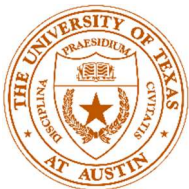
1. <https://solarbuildermag.com/operations-maintenance/terra-pave-top-seal-soil-binder-debuts-to-reduce-dust-boost-albedo-on-solar-pv-sites/>
2. <https://www.solarpowerworldonline.com/2020/04/terra-pave-sealant-creates-high-albedo-ground-cover-for-solar-systems/>



<http://www.ecoestates.us/tp.html>

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Is Your Parking Lot or Road Strong and Eco-Friendly?



The below image shows ultra-heavy modules that were transported over a 4.5-mile Heavy Haul Road (HHR) for the ExxonMobil GCGV project near Corpus Christi. The HHR can support up to 140psi SPMT wheel loads and transport up to 12,000 Metric Tonne modules.

Details on the project:

- There were over 100 transport runs with over 30 ultra-heavy modules.
- The design was intended for 10,000 cumulative axle-passes at any one point.
- An unsurfaced roadway design technique was used with full scale testing to develop and confirm the roadway.
- The top layer was covered with 8" of aggregate and then sprayed with TerraPave Top Seal White, creating a strong, flat, and flexible waterproof layer that can accommodate the 108' wide loads within the elevation adjusting range of the SPMT wheels.

This winning combination of **dust control, water control, strength, and flexibility** performed as intended with minimal required maintenance over the 18-month window that the HHR was in use. The surface will now partially be converted to a roadway for use by the GCGV Plant.

Made Locally in Austin, TX

Eco-Friendly, Cost-Effective, & Built with Superior Strength & Quality

