

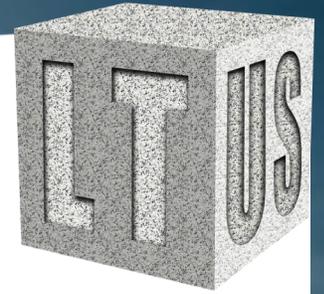
Summary of the Differences Between Soil Stabilizers and Accelerated Lithification

This document is to help you understand the difference between the various types of “Soil Stabilization” products and dry LithTec™. Soil Stabilization products fall into **5 categories** and they are all in a *liquid form*.

1. There are **dust suppressant products** such as **Magnesium and Calcium Chloride** (which are forms of salt). We hear that some of these companies claim their products to be soil stabilizers. However their *primary* function is as a dust suppressant. They are hydrophilic in nature which means they attract water. They help to reduce the dust coming from a dirt road by pulling the moisture out of the air / humidity and into the mag chloride treated road. The soil appears darker in color, as if a water truck had recently sprayed it, which helps reduce the amount of dust coming off the road. The application can last up to 6 months or *until the first good rain* as the product is guaranteed to wash out of the road, as it attracts water. The last thing that you would want in a road is a product that attracts water thereby turning the road into mud. Water and heavy weight loads are the top two reasons that cause roads fail. LithTec™ on the other hand turns the road base or subgrade into a rock-hard and water resistant road foundation that remains bound and non-dispersive while under water. You would witness this with the two soil samples (one treated with LithTec™ and one untreated) submerged under water at the same time. The untreated proctor immediately will start disintegrating turning the water muddy and the cylinder will lose approximately half of its original size in a very short time. The LithTec™ treated sample will remain rock-hard and non-dispersive as no material will fall off and the water will remain clear. Keeping the water out of the road is the number one objective, which is why they say, “the three most important factors in designing a road is *drainage, drainage and drainage.*”

2. **Lignin and Tree Sap** - Lignin is a byproduct that is produced in the process of making paper. It is sometimes called “tree molasses” as it is very sticky and dark brown in color and looks like molasses. It is then diluted with water and sprayed onto the road, mixed in and compacted. It requires a certain amount of clay to help make the dirt become hard after compaction. Unfortunately it is water soluble and the road will turn to mud in rainy or snowy conditions.

3. **Polymers** are made of long repeating molecular chains that look and feel like epoxy or rubber. The liquid polymer is attempting to glue the dirt together and it actually looks like Elmers™ glue when it is being sprayed onto the soil. Polymers can be effective for a while however the heavy weight loads break the bonds holding the soil together especially in cold temperatures when it becomes brittle. Polymers also break down with UV sun light.



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4. **Bio-enzymes** are organic degradable materials, that are introduced as soil improvement additives. A study was performed on three Bio-enzymes and results were measured with X-ray diffraction (XRD), X-ray fluorescence (XRF), and field emission scanning electron microscopy (FESEM). The tests were conducted on untreated and treated soil samples after two months of curing. XRD and XRF **did not show any change in mineralogy and chemical composition between controlled untreated samples and samples treated** with the three bio-enzymes. In summary the FESEM images revealed a denser packing of particles for soil samples treated with two of the bio-enzymes, which can aid in compaction.

5. **Sulfonated Petroleum Products** such are not designed or manufactured to improve or enhance soil performance, rather it is simply a byproduct that is left over in the process of refining oil. It is often sold as a “soil stabilizer” such as RoadPacker. The sulfonated petroleum will leach out of the soil and into the plant life and water tables and is harmful to the environment. This brand and other sulfonated petroleum products can temporarily make the soil harder if certain clays are present however the product is water soluble and the road will become muddy under snow and rainy conditions.

- ◆ **All liquid Soil Stabilizers** have the limitation of how much product you can put into the soil before the soil exceeds Optimum Moisture Content (OMC). Every soil type or classifications has an Optimum Moisture that will achieve the maximum strength during compaction. When OMC is exceeded, the soil turns to mud or begins pumping at which time the strength and load bearing capacity is diminished. With all liquid products, you cannot put enough product into the soil to achieve the optimum strength as you have the limitation of OMC.
- ◆ **Accelerated Lithification Technology** is *not* considered to be a “soil stabilizer” at all, as the word itself implies that the product is trying to “stabilize the soil” LithTec™ technology is not gluing the dirt together like a polymer or making it sticky like a lignin, molasses or tree sap which is simply a compaction aid, that washes out under rain and snow conditions. Instead, the LithTec™ process transforms the soil or road base material at the molecular level, turning it into a rock-hard water resistant base with **unprecedented load bearing capacity**. This is the 1st product to achieve **double the strength of cement** and **3-4 times the ductility**. The Company spent over \$15M and nine years in development to be able to say: *Don't listen to us, let any third party laboratory run the tests and let them tell you what they discovered*, as the test results will speak for themselves.