

SUMMARY of STEPS to ROAD STABILIZATION

EcoZyme
ENZYMES CC

“Creating Pathways to the Future”

GRADING & CONDITIONING:

PHASE 1 & 3

- The first step, the Grader with rake attachments is used to plow the soil in straight lanes to the length of the designated area or length of road and repeated side by side until the entire area is plowed or broken up. If the existing roadbed is too hard to blade, scarify to the required depth.
- This process breaks up the soil and prepares it for the next steps. It is very important to plow and break up the soil to the desired depth.

MOTOR GRADER



WATER TRUCK



PHASE 2

- This process is conducted with the water truck/tanker containing the proper amount of Permazyme 11x™. The quantity of water used to treat a zone will depend on the soil type present but should be at a minimum of 500 to 1 parts.
- The enzyme-water mixture is added to the soil by leading the grader that is breaking or plowing the soil. With top loading water tanks, always fill the tank with water first, and then add the Permazyme 11x™. Failure to do this will result in a tank full of foam.

COMPACTION & LEVELING

PHASE 4

- The first step, A Sheep's Foot Compactor (Optional recommended to be used for high PSI compaction & to activate the Enzyme curing process. It provides pinpoint pressure all across the soil. Protruding studs on the drum similar to a sheep's foot, which creates a kneading action.
- This process aid in slotting soil aggregates for greater adhesion of the Enzyme, thus producing optimum compaction & curing

SHEEP'S FOOT COMPACTOR



DRUM COMPACTOR



PHASE 5

- This process with a Drum Compactor to complete the compaction of soil and Enzymes for a desired leveling and density. It is one of the most, if not the most important steps in achieving the best pavement results.
- Not only does it aid in activating the curing process of the Enzyme mix, it is vital in grading uneven surfaces of the soil, creating an attractive yet practical surface for use.

CHIPSEALING (OPTIONAL)

PHASE 6

- Hot Mix ChipSeal pavement is produced by heating liquid asphalt and mixing it with small rock aggregates, with the mix then spread and compacted to form a durable road structure and improved riding surface.
- This process *Chip Sealing* uses the same ingredients as asphalt concrete paving, but the construction method is different.
- It is designed to seal and protect the pavement and extend the life of the road.

PNEUMATIC ROLLER



- The use of a pneumatic roller (or rubber tire roller) is vital in the compaction process of Chipseal paving, in that, it is able to conform to the surface being paved. Kneading the hot mix liquid asphalt with its oscillating tires into the base. Not only does this achieve denser compaction, but it also drives the bigger aggregate in the mix down, thus bringing the fine aggregate to the top.
- This process actually seals the aggregates better to eliminate voids and preventing water intrusion.



NOTE PHASE 1

The construction area must be ripped, scarified, disked, rototilled or bladed to a depth of 6 –12 inches, depending on the load bearing requirements.

As with all road/pad/surface construction, the soil should contain a wide range of material sizes to provide shear strength and internal friction which increases load bearing values.

NOTE PHASE 2

The amount of water mixed with Permazyme 11x™ should be dispensed from a spray bar at a rate that moistens the soil but does not create mud. The consistency example as seen in picture.





PHASE 2

- The mixing phase cannot be rushed. It takes mixing over and over for the majority of the day. The soil must not get too dry and it can't be allowed to become a mud puddle. The pictures show, for the most part, the proper moisture consistency of the soil.
- This would be considered one lane (as in a 25 feet wide road.) As with a road, the grader blade mixes the soil with the water truck, with product spraying ahead of it all day long, back and forth.

PHASE 3

- At the end of the first phase, the grader blade moves all of the mixed soil to each side of the road/lane in what we call a **windrow**. These **windrows** are allowed to aerate overnight and will set the stage for the second day and final stage of the process.





PHASE 2

- After the entire area of soil or length of road is broken up, the grader then begins to use the blade to mix the soil in road lanes.
- This thoroughly mixes the soil with the product and aerates the soil in the process. If there is no native aggregate, this is the point during this mixing phase that the aggregate is introduced.

PHASE 3

- The depth that the loose soil is mixed will vary depending on the prospected load that the road is to be built to carry. To achieve 6 to 8 inches of a compacted layer, it will require 35 to 40 inches of loose soil. This is what is required to get a hard packed layer.
- With the water truck leading, the grader blade mixes the soil by blading it to one side of the lane, moving in one direction and blading (mixing) it back in the opposite direction.





PHASE 4

- The sheep's foot compactor is ideal but is not absolutely required. It is not going to prevent you from making a good road. However, this equipment can be vital for pinpoint compressions. Thus, compacting soil & aggregates for an optimum base.

PHASE 5

- This will create a very smooth finish. The vibrator should be turned off of the Drum compactor 2 layers after the sheep's foot compactor is discontinued and remain off until the job is done.
- The key to a Permazyme 11x™ road is the thorough mixing of the soil and a heavy concentration of the compaction process. The rationale is by compacting thin layers, we are able to create a super strong layer because Permazyme 11x™ aids in fusing the soil particles into a solid layer of soil that is equal to or in excess of 100% compaction.





PHASE 6 (OPTIONAL)

- Chipsealing is optional, however, it will create an aesthetically pleasing road as well as seal & protect a longer lasting road. This is also why it is water resistant, as it does not absorb moisture and turning the road into a mud puddle. In addition, to achieve a smoother finish, a pneumatic roller will be employed.

PHASE 6

- The Pneumatic roller will provide a smooth surface. The road is now ready for use. If you foresee heavy, high-speed traffic, involving spinning of skidding wheels, you might consider closing the road until the material has had a chance to cure for 2 to 3 days. Normal traffic will not harm it.



EQUIPMENT REQUIREMENTS

MOTOR GRADER



WATER TRUCK



DRUM COMPACTOR



SHEEP'S FOOT COMPACTOR



PNEUMATIC ROLLER



Creating:

Attractive & Stabilized Road



Pre-Planning Phase

PREPARATION & PLANNING:

1. Plan project with supervisory personnel.
2. Assemble all required Equipment.
3. Make equipment maintenance checks.
4. Verify fuel supply.
5. Verify & plan for water & water supply.
6. Verify Enzyme supply.
7. Meet with operator personnel & discuss procedure.
8. If new soil is required, it should be brought in and put in place.
9. Road barriers should be assembled and checked.
10. Traffic diversion plan should be finalized.
11. Traffic control personnel should be instructed according to the work plan.
12. Instructions should be given in case of rain.
13. Security for equipment should be arranged.
14. Contingency plans for in case of equipment failure or problems.

“Live” Road Building Phase

Phase 1 -3:

1. Mix PERMAZYME 11X with water in water truck
2. Break up soil with rippers on grader.
3. Cut shoulders with grader on each side of road first.
4. Mix soil with grader and (add aggregate if necessary).
5. Moisten soil with water truck spray bar.
6. Mix soil with grader blade from each side to the other.
7. Repeat #5 – #6 until moisture content achieved.
8. Wind row with grader blade on each side of road.
9. Moisten wind row soil with water truck spray bar.
10. Moisten soil in front of grader.
11. Grader blade 2” lifts/layer from wind row.

Phase 4-6:

1. Sheep’s foot compactor follow grader blade.
2. Drum Compactor with vibrator on follows Sheep’s foot compactor.
3. Repeat #1 & #2 for 3/4 of expected depth or windrow.
4. Continue to moisten wind row.
5. Continue to use grader to blade 2” lifts.
6. Continue to use Drum compactor with vibrator off.
7. Repeat #3 - #5 for last 1/4 of expected depth.
8. Add ChipSeal on to after minimum of 24hrs of curing.
9. Moisten surface in front of Pneumatic roller.
10. Use Pneumatic compaction for smoothing final finish.

* Allow to set for 24hrs with no traffic use. Traffic use too soon will cause rutting.