

# Hypertufa for Roadbed and Landscaping

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1. What is Hypertufa? It is concrete mix that can be used for Garden Railroad sub roadbed and other landscaping uses. Can be used for railroad sub-base and simulating roads and landscaping, such as roads and retaining walls and simulating rock.
  - a. Can be troweled on, shaped with your hands like oatmeal, textured and colored easily with a longer working time (about 30 minutes).
  - b. Plant friendly; moss will grow on it, can leave holes for desired plants.
  - c. Lighter than concrete.
  - d. Easy to cut and drill after it is hard.
  - e. Takes a long time to dry completely; one day to get to the green stage, several days to harden, continues to get lighter in color for two weeks. If this is in the sun, cover it with plastic so it does not dry too fast, you can sprinkle with water after a few hours to slow the setting.
2. Cement Mixing Formulas
  - a. Hypertufa for Roadbed and simulating roads, suggest using one quart as one part of the measure and mixing as a one or batches at a time.
    1. One part Cement
    2. Two parts Sand
    3. Two parts Peat Moss
    4. Approximately 1-1/2 parts water, you can add more as desired.
    5. Coloring, use about 1 to 3 oz. for each quart of cement
  - b. Hypertufa for simulating rock walls.
    1. One part Cement
    2. One part Pearlite or Vermiculite
    3. One part Peat Moss
    4. Water to a stiff mix
    5. Coloring, use about 1 to 3 oz. with one quart of cement
  - c. Mortar Mix
    1. One part Cement
    2. Four parts Sand
    3. Water to a stiff mix
  - d. Concrete Mix
    1. One part Cement
    2. Two parts Sand
    3. Two parts gravel
    4. Water to a stiff mix
3. Mixing suggestions
  - a. Get four 5 quart Multi-Purpose plastic calibrated storage containers, these have metric and US volumes for measuring, available at Ace hardware stores. With these you can pre-measure each component.
  - b. To add color mix this into the water before adding it to the mixture.
  - c. Use a 5 gallon pail and mix a double one quart load
  - d. Use a five gallon metal paint mixer or a mortar mixer with a strong electric drill.
  - e. To get the peat moss broken up fine, use a second five gallon bucket fill the bucket about half way with peat moss, break up any larger chunks and as many smaller ones as practical, and mix with the paint mixer until it is all very fine, break up any remaining chunks.

- f. Put the sand in first and then the cement, mix these thoroughly with part of the water, make this fairly soupy and start adding the peat moss and more water.

## **Roadbed for Railroad Track**

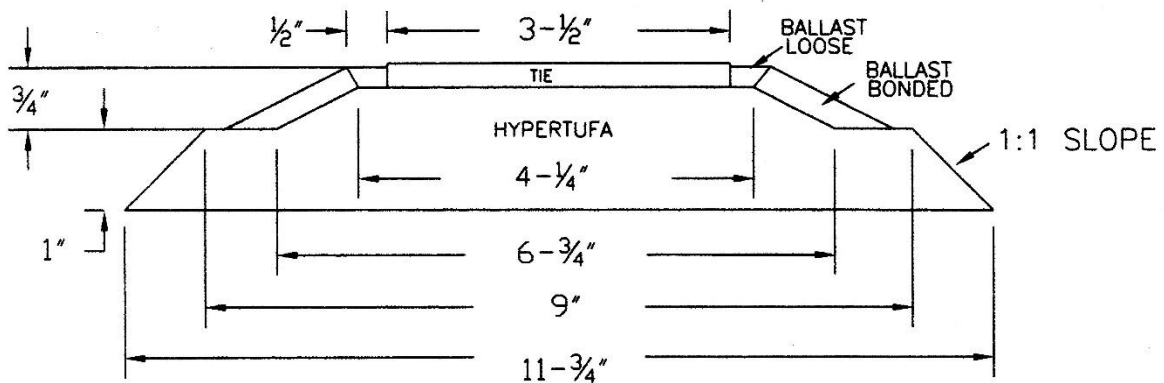
4. Coloring the roadbed
  - a. Use Quickrete liquid cement color. Use two to three oz. of color per one quart of cement.
  - b. Vary the mixtures of colors to obtain the desired results. Try other mixes to get the results you like. The color is not of major importance as it is mostly covered up with ballast.
    - i. Reddish brown use about 1 oz. charcoal and 2 oz. buff
    - ii. Brownish dirt color use 1 oz. charcoal and 1oz. buff. I prefer this color
    - iii. For black you can dilute black latex house paint 1:16 with water.
5. Bonding Ballast, See drawings on last page.
  - a. I start this process the day after the roadbed is put in place
  - b. If you completely bond the ballast between the ties, it will cause the same problems as fastening to a hard surface. Use free floating track in a trough formed with bonded ballast each side of the ties. Leave room on both sides of the ties for the track to move for expansion and contraction. Fill in between the ties and out to the bonded ballast with loose ballast and do not bond this in any way. This gives you track that is largely maintenance free from year to year, but still requires minor leveling occasionally and some of the loose ballast will wash out with heavy rains or hail.
    - i. Bonding material options, Concrete Bonding Adhesive, only one brand works, "Quickrete Bonding Adhesive"
    - ii. Waterproof glue such as Titebond III mixed with ballast or drizzled over the loose ballast. Not as strong as Quickrete Bonding Adhesive.
  - c. Using Concrete Bonding Adhesive
    - i. To form a wedge of ballast outside of area where the ties will be, mix ballast with the liquid bonder until it has a wet look. Apply this to the road base slope and up to near the ties forming a free trough for the ties and loose ballast. After this has dried follow with a dilute (one part bonder to 3 parts Water and some liquid detergent as a wetting agent, about 2 to 3 oz. per gallon) solution of bonder. I used a universal spray bottle and thoroughly saturated the bonded ballast area. When dry follow this with a full strength application of the bonder. I used a baster for this application.
    - ii. Now you can place the track and ballast with loose ballast in and around the ties.
  - d. Notes on application
    - i. Wet the ground slightly when applying to a dirt area
    - ii. Lay out your track centerline with landscape nails 8 or 10 inches long with the top of the nail at the finished height of the road base. Space these not more than 2 feet apart and closer on curves. Paint the nail heads with white of a bright color so they stand out and you can find them easily. You could also use small stakes. Remove these after the roadbed is complete and repair the hole while it is still workable.
    - iii. Cut templates for the top of the roadbed out of 2"x 4" wood. I recommend three different ones. One full template, one with the long slope cut off for area near an upslope, and one with just the top area for close quarters. Mark the track centerline on both sides of each one with a black marker. Seal these with a water sealer to keep the mixture from sticking to it and it will clean up easier. Use these to form the top of the roadbed. You cannot drag them, you just need to keep pressing them down as you go along. See picture below.
    - iv. Also use a cement float or create your own with a 1 x 4 and a 2 x 2 as a handle and make it 2 to 3 ' long, seal this also. Make sure it is straight and flat. You can use this to

maintain the correct top height by floating it along the top of the nails locating the track center and grade height.

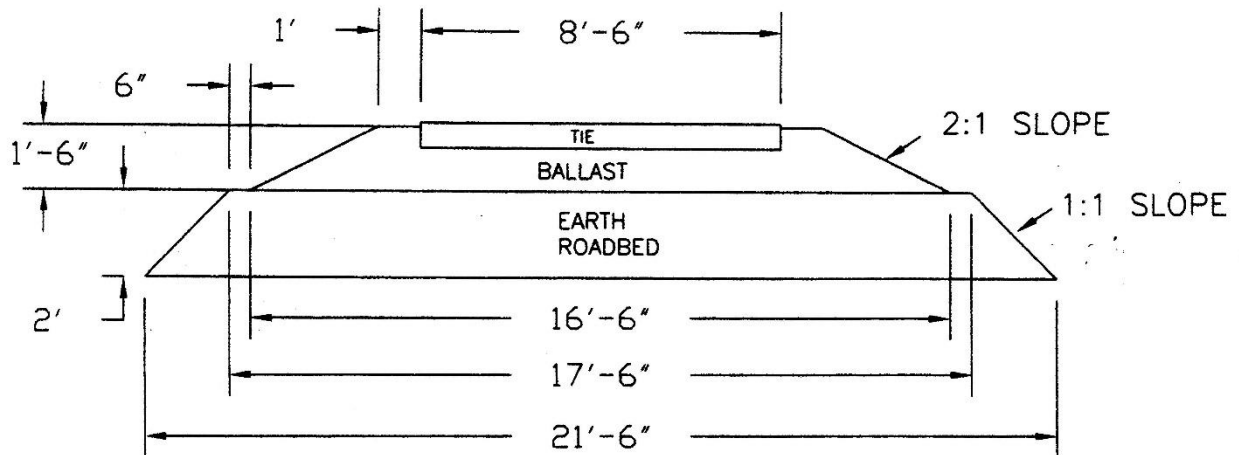
- v. Get a short level 6" or less and use this on top of your templates or on the roadbed to get it level side to side.
- vi. A small rectangular Margin trowel 2" x 5" is very helpful in troweling and smoothing out the final shape, a larger rectangular finishing trowel is also desirable.



**Templates and float used for Roadbed**



**Hypertufa roadbed with bonded ballast**



**Typical Prototype Roadbed**

## **Structure Foundations and Roads**

6. For roads I use the same material as for the road base, at least one inch thick and treated the adjoining slope in the same manner as the bonded ballast.
  - a. For gravel roads apply sand with and apply the liquid bonder full strength to the sand. Apply a second and third dilute application, then an additional full strength coat. You can put ruts and wheel tracks if desired in the sand and also in the base.
  - b. For asphalt roads mix black or charcoal for color and leave the road smooth.
    - i. The mortar mix or concrete mix can also be used for roads.
7. Structure Foundations
  - i. Mortar mix works well or you can use the concrete mix.
  - ii. Use ¼" wire screen for reinforcement halfway through the pour
  - iii. For forming sharp edges and scribing use Quickrete Vinyl Patching Cement

## **Simulating Rock Embankments or other Rock Work**

8. These can be simulated in many ways and colored as you desire.
  - a. Using Hypertufa for terrain
    - i. Cover with plastic for at least 1 day to slow the curing time, if it dries out too fast it will crumble.
    - ii. Wear rubber gloves when forming by hand
    - iii. Wet the ground slightly when applying to a dirt area
    - iv. Peat Moss can be bonded over the Hypertufa
  - b. You can use a bucket or tub as a form and fill the bottom with crumpled up newspaper, leaves, crumpled up foil, or other similar items. Then press the mixture into these making it about 2 inches or more in thickness. When dry dump it out and clean off the debris, then wire brush it to improve the rock effect. You can add additional color effects as desired.
  - c. Another method I have seen used with concrete is to crumple up aluminum foil very tightly and then spread it out to the desired contour and place the mixture onto the foil, let it stiffen a bit and then place this onto your scenery in the desired location with the foil facing out, then remove the foil, add more coloring if desired. This probably works best when it is placed over an existing solid surface, such as cement, cement blocks, or a foundation material such as used for the road base. It might be best to coat cement products with the bonder first to get a good bond.

Errata: This document was created by Byron Fenton in July 2015, much of this material was from a clinic presented by Paul Wagner in Tampa, Florida at the 2014 NGRC. I have added more information based on my experience and left out some items I deemed un-necessary. Some information about the landscaping product was from Curtis Utley at a DGRS meeting. I have not used any of this for landscaping, but have used it for roadbed and roads, it works great.