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General Gravel Construction Pointers for Homeowners

by Dan May, President of Polar Mining, Inc.

We are pleased to offer the following tips for working with gravel, building roads and constructing pads, as well as extending the life of those projects in Interior Alaska.

Permafrost Conditions

When building across permafrost with gravel, don't disturb the vegetation prior to placing road base gravel. Use the existing undisturbed vegetation as a natural insulation to slow the thawing of permafrost soils. Chainsaw any larger trees in the roadway and either use them for firewood or let them lay as corduroy. Usually the trees on permafrost soils don't grow very tall anyway. Smaller brush can be laid over with the base fill gravel placement. In areas where there are deep ice lenses in the soil and they begin to thaw, they may go on thawing for years, requiring repeated buildup of the affected and sinking road through these tough spots. I find that our 6MT material works best for such permafrost areas, topped with either our FRT, CRT or AD1 material.

Use of Fabric in the Road Base

I'm often asked about the use of fabric in a road base. I should acknowledge upfront that I may be a bit biased on this subject as I sell gravel, not fabric. The theory is that the use of fabric will allow for a thinner road base. Based on my usage experience, I think it works better to use a thicker gravel base initially and forego the fabric. The downside to fabric usage is that the additional surface preparation needed to prevent puncture/tears will often disturb the insulating quality of the vegetation mat, thus reducing its insulating quality. Also, the undulating nature of most surfaces will make for thicker/thinner gravel base because the road surface will be an average contour. I've seen many roads over the years where these thinner areas have had the fabric work up and be cut or ruined by grading, right where it's needed most, creating a soft spot. The additional cost of the fabric, plus additional site preparation and installation labor, can exceed the cost of another added foot of gravel base during construction. In our application with heavy equipment traffic, fabric will not hold up to the stresses generated, so we no longer use it. Of course, we also have access to great locking tailings, both 6MT and 6BL (see the video of capping 30 feet of mud with 3 to 4 feet of 6MT tailings.)

Importance of Compaction

When using any type gravel to build roads or pads, the importance of good compaction cannot be too highly stressed. Use of a vibrating roller compactor—with water, or a plate compactor on smaller jobs—is highly recommended. On thicker fill areas, multiple lifts with repeated material placement, then compaction, will be needed to achieve good results. Often the homeowner will try to shortcut this step, or just use the available rubber-tired vehicles. Though the latter is better than the former, it does not take the place of good compaction. Poor compaction will result in a softer base, with ruts forming during use, which will collect water (see next paragraph), and cause soft shoulders, all of which give unsatisfactory results. Good compaction also slows the penetration rate of water.

Importance of Drainage

It has been said that there are three things that will destroy a good road faster than anything else. In order of importance, they are: 1) Water, 2) Water, 3) **WATER**. In any form, running water, standing water or spring water (working up from below) will soften and destroy a good road faster than anything else. PERIOD.

The secret to preventing this destruction is to build with good drainage. This is achieved using good road crowns, sloping of pads, using culverts where needed, and building good ditches to allow for adequate drainage. The thickness of the road base gravel is also important. I recommend a minimum of 2 feet of road base gravel, above ditch levels. This number can vary based on the condition of existing soils where the road is to be placed, i.e., poor soils require a thicker base, and good firm soils require less material.

When water is left to puddle on a surface, it will soak in and soften the gravels, starting with the topping materials and working down into the base. A puddle thus becomes a pothole where there is vehicle travel, which can lead to more water collection, getting progressively worse until you wind up with a mudhole. Proper routine maintenance of the road surface, as needed, is very important. Keep in mind that it's much easier to fill a pothole that still has a good base than to fix a mudhole that's lost its base! Use any of our 3 topping products to patch these potholes, which can be done by hand before they get too bad. When patching, don't forget about continuing the shaping for drainage as you repair.

Cost Savings Tip

Another tip to keep in mind when hand-patching, using a pickup truck or dump trailer to haul patching material, is that due to the load minimum charge, you can often get the AD1 product (1st choice for patching) for the same price as the lesser-priced CRT (2nd choice) or FRT.

Plan Ahead for Drainage

A good drainage plan is important to have before beginning construction. In a nutshell, this planning should consider where the runoff water will be coming from, how much water will need to be handled, including storm events, and where you need to have it go. This may be easily done when building in hilly areas but be tougher when building in flat or poorly-drained areas. Either way, it's important to have a plan for water drainage.

Gravel Contractor Experience and Knowledge

On most larger jobs the homeowner will not have the heavy equipment necessary for completing the work, so they will need to hire a dirt work contractor. (Use the delivery button for a list of some of the contractors who use our products.) Most of these businesses know their stuff – it's what they do. Listen to them. If they recommend a different product from another source, then certainly consider it and listen to their reasons why. Often the haulage costs can exceed the material cost, and the contractors also have favorite materials they like to work with. They will also know other factors, such as road conditions, pit turnaround times, heavy loads vs. light loads, and material consistency. All these factors, and more, will influence their recommendations. I'm confident that our products and service will be judged the "right stuff" most of the time, but not always. I can live with that.

I'll never forget when building my house in the 70's, Harold Ellingson from ACE Contracting came out and looked over my site, as I was then looking for bids. He told me he could see I needed three different types of gravel for my job, he knew where to get them all, had a rough idea of how much of each material was needed, knew my budget, and said he could do a good job for me – which he did. I paid him once for all the different materials, and his work efforts too. I didn't have to go shopping for each product, compare prices, and arrange multiple deliveries, which saved me a ton of time and headaches. So in a nutshell, when needed, hire a reputable dirt work contractor, and listen to their material recommendations.

Homeowner Tools

Many dump trailers have tailgates that can be set to restricted openings with chains to allow for limited spreading of the smaller AD1 – FRT topping gravels. Using this spreading method takes a bit of trial and error, and it may require help from a spotter, but it can be helpful to the homeowner. Stretching a few yards of this topping gravel in the center of a driveway can help replace and repair the surface and re-establish surface crowning for drainage. These materials hand-rake quickly and easily before compaction.

Also, a 4-wheeler with a snowblade (or a pick-up with a plow) can be used to smooth the topping. The best use methods will vary with the 4-wheeler and operator's skill, but generally

back-blading, with the blade angled or straight, can give fairly good results and even help with crowning. Also, if no snowplow is available, I've seen many homeowners improvise a drag, pulled behind a 4-wheeler, to rake, level and smooth the surface. Again, this works best with our AD1 or FRT toppings. Once you get to the larger size materials, it doesn't work as well.

In Conclusion

None of the foregoing construction tips should supersede the design advice of a professionally engineered construction plan, if you have one. The foregoing advice is given as a conglomerate—"my general opinion" answer—to many of the questions I've been asked over the years.

Please understand that we can accept no liability for any injuries that may occur to the homeowner when using the briefly-described general methods above. It is assumed that the homeowner is proficient with the safe use of his or her own tools and that safe work practices are followed.

The homeowner also needs to be aware that there can be permits required for construction, across wetlands for example, even on your own private property. For the purpose of these tips, it is assumed that the homeowner is aware of and has fulfilled all permit requirements.

Thank You

Through gravel sales over the years, I've been privileged to meet many hardworking, independent, resourceful homeowners who are a hardy "do-it-yourself" breed somewhat unique to Alaska. As the owner/builder of a 40+ year old DIY home that I still live in, I'd like to think I fit in this category, and I know firsthand the challenges you face. Although most of our business sales are to gravel contractors, I also recognize that a good chunk of that business is direct sales to homeowners. I know you have a choice where to purchase the gravel you need, and I want to thank you for choosing us.