



SC Mud P

Bored Pile Construction

SC Mud P is a newly developed, easy mixing cross linked dry granular polymer, that when mixed with fresh water will produce a clear viscous bore hole stabilising fluid suitable for use in bored pile construction, auger drilling, trenching and reverse circulation drilling.

Advantages

SC Mud P is easy to mix with moderate shear. Best mixed through a venturie type hopper or added to the flow of water being pumped to the mixing tank. It can also be mixed with the aid of air agitation in the mixing tank. SC Mud P is a fine granular polymer, so is resistant to balling up and forming “fish eyes” in the mixing tank.

Only small amounts are required, generally 0.5 to 1 kg / m³ of SC Mud P is sufficient to product a slurry with a Marsh Funnel viscosity of 40 to 55 sec / ltr. The hydration time of the SC Mud P is very short, so over all mixing time is quick and the labour required and cost involved is minimized.

The SC Mud P system does not require the use of de-sanding and other associated solids control equipment. This reduction in plant and equipment and the labour requirement reduces clutter in the work site and reduces labour and running costs.

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The displacement of the SC Mud P slurry by cement in a bored pile is clean and effective, with minimal interface contamination. The cement to metal and soil bond is considerably better than what results in a bentonite slurry, producing an improvement in side wall loading of the completed pile.

The SC Mud P slurry can be reused from a completed pile simply by adjusting the pH and required viscosity, before reuse.

Surplus SC Mud P slurry at the completion of a project can be chemically degraded with sodium hypochlorite, house hold bleach, for disposal.

Applications

SC Mud P provides a clay free drilling, bore hole stabilising slurry, suitable for a wide variety of soil types and drilling styles.

The low Yield Point and Gel Strength of the SC Mud P slurry allows rapid settling of drilled solids, thus eliminating the need for expensive and bulky solids control equipment. A considerable advantage for space limited construction sites.

The SC Mud P slurry is applicable where maximum side wall loading is a requirement for the completed pile.

SC Mud P provides the high cohesiveness required to bind unconsolidated sands and gravel to allow their excavation and improve bore stability.

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Recommended mixing procedure for used fluid

Experience suggests that controlling the funnel viscosity of the fluid in the bore hole at 45 to 55 sec / ltr gives good hole stability. This means adding fluid at approx 50 to 80 sec / ltr to allow active polymer to encapsulate the drill solids and coat out on the bore wall. In effect, some of the polymer is sacrificed in doing its job and is lost along with the drill solids. The polymer fluid displaced during the cementing is returned to the mixing tank for treatment. This will mean the addition of SC Mud P to replenish the active polymer, ready for the next drilling cycle. Adjust the pH before adding more SC Mud P if required.



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Recommended Treatment

Assuming the use of town water, adjust the pH of the mix water to 9.0 to 9.5. with the use of soda ash, at approximately 0.5 ltr /m³. On the job site its generally easier to use volume to measure product, than it is to use weight. So 0.4 kg is approx 0.5 ltr for soda ash.

This will treat out any hardness, ie calcium in the water and provide a slightly alkaline environment for the SC Mud P to hydrate in.

We recommend the use of soda ash over the use of caustic soda as it is less hazardous.

Then add the SC Mud P at 0.75 ltr to 1.5 ltr / m³, this equates to approximately 0.5 to 1.0 kg / m³ and allow to hydrate with some agitation from a paddle type mixer or air agitation for say 5 min.

The resultant fluid will have a Marsh Funnel viscosity of approximately 40 to 60 sec / ltr and a pH of 9.0.

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Points to watch.

It's important to monitor the viscosity of the polymer fluid in the bore hole and keep it in the 40 to 55 sec / ltr range. This range is recommended, but maybe changed to suit local ground conditions. It's controlled in this range by adjusting the viscosity of the polymer fluid added to the bore hole as drilling progresses. Keep in mind the active polymer is sacrificial, its being used up doing its job of encapsulation and binding in and onto the bore hole wall.

It's also important to keep as much hydrostatic pressure as practical on the formation. Watch the polymer draining off the Kelly bar and bucket. If its "stringing" like shown in the photo, it's a good indication there is free polymer in the system and the mud is in good shape.



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If its not “stringing” off the bucket, it means there is no free polymer available to coat out newly drilled formation and the mud is back to water, not good.

If loss circulation is encountered we recommend treating the SC MUD P system with pre-hydrated bentonite to provide the system with a colloidal substance to help bridge and block the thief zone. We would recommend first adding 5-10kg of bentonite per cubic metre of fresh water, allowing 5 minutes mixing time before introducing the polymer at 0.5kg per cubic metre. Alternatively it is possible to make a heavy bentonite mud at 70-80kg per cubic metre and allow to hydrate for 1 hour then dose this directly into the hole and allow it to mix with the working polymer.

Another point to take care of is to avoid so called “surge and swab pressures” by making sure the Kelly bar is not moved to quickly up and down creating a vacuum type effect. This really comes down to the skill of the rig operator.

Conclusion.

The use of our SC MUD P polymer based drilling fluid for the construction of bored piles can provide significant economic and productivity based improvements for the foundation contractor as compared to a conventional bentonite mud or gel system. However it must be remembered that not all ground conditions are suitable for polymer and the best advice is to consult with your local Sud-Chemie representative.

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