

Derrick[®] Mini Separation System and DE-7200[™] VFD[™] optimize cutter soil mixing technology project

- Eliminate the need to “gravity settle” out solids in a series of settling tanks or utilize vac trucks
- More efficient and economical operation positively impacting the contractor’s bottom line

Background

Cutter soil mixing technology is a process of mixing soil In-Situ with a cement bentonite grout via a drill rig for ground stabilization and cut off wall projects.

In urban environments, the most economical means of disposing of the slurry generated through the drilling process is typically through mechanical separation.

A contractor in Western U.S.A. is using a Derrick[®] Mini Separation System (12-MSS) and DE-7200[™] VFD[™] Centrifuge in conjunction with their drill rig treating on average 100 GPM of slurry. The slurry from the drill rig is typically fine solids laden, with mud weights in the vicinity of 12 PPG making slurry separation a challenging task.

Solution

The Mini Separation System, consisting of a FLC 423 double deck shaker with ten 4” desilter hydrocyclones, base tank and 6x5 centrifugal pump, performs the first two stages of separation. Slurry from the excavation process is fed to the bottom deck of the FLC 423 shaker for a primary separation at approximately 500 microns (35 mesh). The underflow from this stage of screening gravity flows to the first chamber of the base tank and is pumped via the centrifugal pump to the ten desilter cones for a secondary separation which make a nominal d50 cut of approximately 25 microns. The cone underflow is directed to the top deck of the FLC 423 double deck shaker for further dewatering. The linear motion action of the shaker conveys solids off both decks in a dewatered state for handling with a front end loader. Hydrocyclone overflow is routed to the second chamber of the base tank. Specifically designed weir openings in the divider wall between chamber one and two allow for backflow to chamber one from chamber two so that the centrifugal pump never runs dry or cavitates, even when no fresh slurry is being fed to the system.



Derrick Mini Separation System and DE-7200 VFD Centrifuge

A positive displacement feed pump takes slurry from the second chamber of the Mini Separation System and feeds the high speed, decanting DE-7200 VFD centrifuge. A polymer dosing system adds polymer to the feed line of the centrifuge to help bond the ultra fine clay particles together so that a semi-clear effluent discharge from the centrifuge may be obtained and returned to the excavation process. The VFD controls of the centrifuge allow the operator to control pump output, along with speeds of the centrifuge bowl and conveyor to maximize performance of the unit in ever changing ground conditions. Discharged solids from the centrifuge are in a stackable, conveyable state for easy handling and disposal. The cleaned fluid from the centrifuge is now immediately available to be re-introduced to the excavation process without further settling or cleanup time helping the contractor maximize daily production with minimal labor.

Conclusion

The Mini Separation System and DE-7200 centrifuge eliminate the need to “gravity settle” out the solids in the series of settling tanks or utilize costly vac trucks that were used prior to the Derrick separation equipment being introduced to the flow sheet. This translates to a significantly more efficient and economical operation positively impacting the contractor’s bottom line. Additionally, Derrick’s 12’ separation system offers operators a small, compact, and mobile solution to their solids control challenges.



Derrick hydrocyclones operating on the FLC 423



Dewatered solids off the FLC 423 deck

For more information, please contact your local Derrick sales representative.

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