Super Mud Polymer Slurry

for

Excavation Perfection

PDSCo

POLYMER DRILLING SYSTEMS

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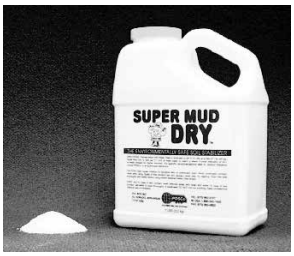
Environmentally Friendly . High Efficiency . Cost Effective



Liquid	***Physical Appearance***	Granular Solid
White	***Color***	Off-white
In 5 gallon (19 liter) pail	***Packaging***	25 kg bags & 7 lb (3.18 kg) jugs (6 jugs per case)
	Mixing ratio:	
800 : 1 (water: Super Mud)	***Freshwater***	1lb (0.45 kg) to 300 gal. (1100 liters)
600 : 1 (water: Super Mud)	***Saltwater***	1lb (0.45 kg) to 200 gal. (750 liters)
Viscosity > 40	***Marsh Funnel Viscosity***	Viscosity > 40

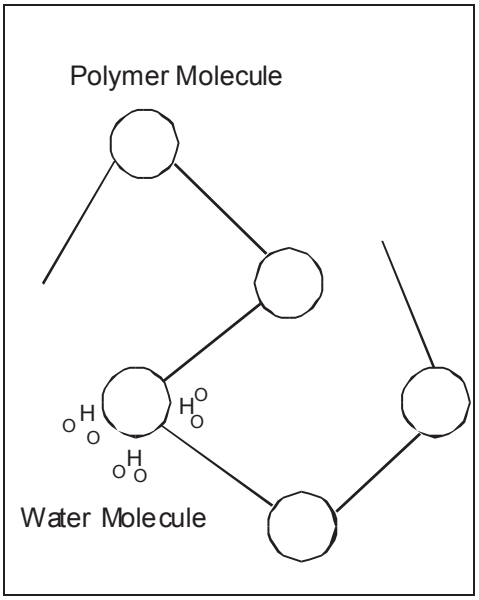
Super Mud and **Super Mud *Dry*** slurries stabilize excavations, maintain cleanliness of the hole, and promote stronger load capacity; at the same time, **Super Mud** and **Super Mud *Dry*** slurries simplify the process of mixing, excavating, and concrete placement. The slurries are renewable and recyclable.

5 Gallons of Super Mud Polymer is Equivalent to 1 US Ton of Conventional Bentonite

COMPARISON

	Super Mud Slurries	**Conventional Bentonite Slurry**
Preparation	Can be mixed instantly in surface tanks or directly in the excavation.	24 hours advanced mixing for full hydration and needs expensive agitator equipped batch tanks.
Weight Comparison	Adds volume but not weight.	Add volume and weight; weight increases with viscosity.
Settling Time	Precipitate the cuttings to the bottom of the excavation for easy cleanout.	Cuttings suspend in the slurry for a long period of time; requires settling tank and desander.
Saltwater Effects	Works in both fresh and saltwater.	Bentonite will not hydrate in saltwater; it separates and breaks down in saltwater.
Recycling	Slurries may be recycled an unlimited number of times without losing quality.	Slurry loses quality after 2- 3 times of recycling.
Concrete Placement	Sand content after 20 minutes is usually less than 1.0%, making concrete placement easy with no affect in strength.	High sand content due to its suspension properties; therefore, the strength of the concrete can be affected.
Environmental Effect	Degradable; friendly to the environment.	Creates a layer impervious to water that can prevent plant growth.
Disposing	Can be broken down with household bleach or Hydrogen Peroxide; may be discharged in storm drain or left on ground to evaporate (depending on local regulations).	Unwanted mud must be properly handled and taken to a landfill for disposal; this is a cost the contractors have to bear.

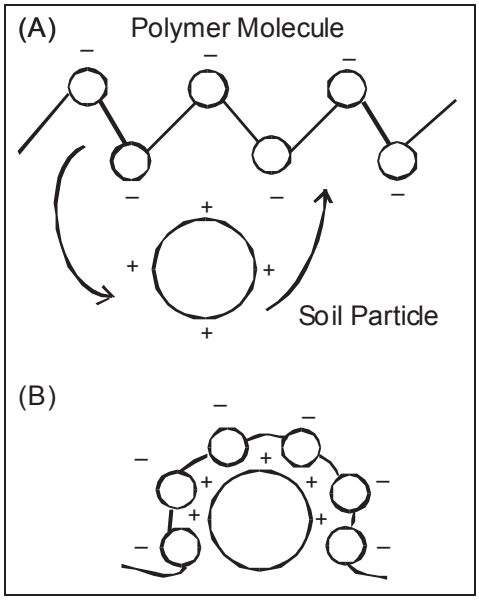
What Is Super Mud and How Does It Work?

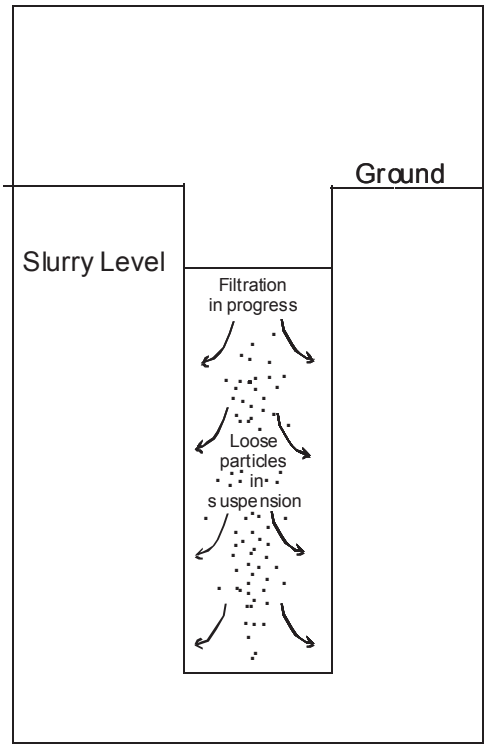


Super Mud is a highly concentrated synthetic polyacrylamide polymer. Super Mud slurries achieve their large molecular structures by the linking of simple repeating units called monomers.

When mixed with water, the water molecules attach themselves to the polymer chain forcing the polymer structure to swell and stiffen. Viscosity increases due to the entanglement and shear strength of the hydrated polymer molecules.
(As demonstrated in the left diagram)

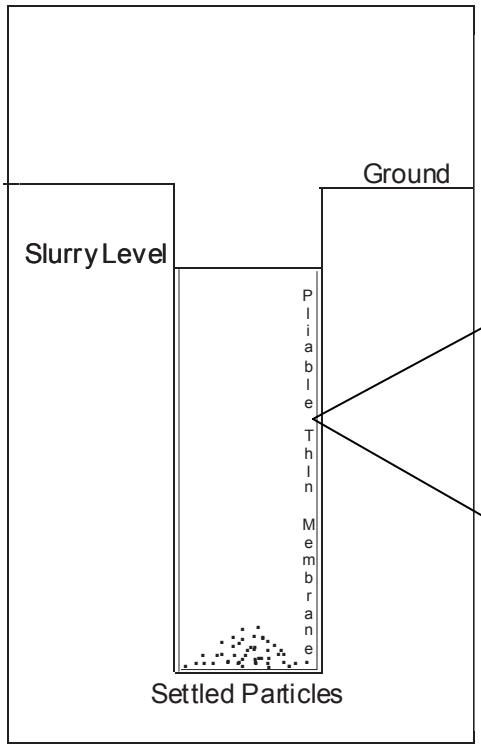
Super Mud polymer slurries are anionic in nature; this means, they have a negative ionic charge. Most soil particles have positive charges on their outside corners. Within the column of slurry, the negatively charged polymer molecules encapsulate and bridge between positively charged soil particles. The clustered soil particles are larger and quickly settle to the bottom of the excavation.
(As demonstrated in the right diagram)





Super Mud slurries act as a flocculent, keeping more cuttings on the auger and settling loose particles to the bottom of the hole.

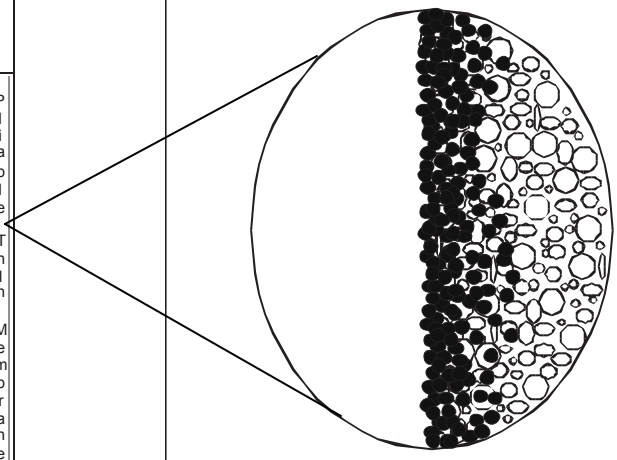
This self cleaning property eliminates the need for desanding equipment.



Super Mud slurries create a very pliable thin membrane that controls fluid loss, yet it can flex as tools are moved past the surface and it provides lubrication for the drilling tools.

This provides a more intimate bond between the poured concrete and the walls of the soil formation.

The anionic polymer chains tend to satisfy the positive charged edges of the soil particles forming a polymeric barrier against migration of water into the matrix of soil being excavated.



In sand
The polymer molecules form a matrix binding the sand particles together.

In Clay
Super Mud encapsulates clay preventing water from hydrating the clay plates and inhibits swelling.

In Shale
Super Mud prevents slaking.

Water Pretreatment

Most slurries are sensitive to various water characteristics that should be treated prior to initial mixing and controlled during excavating for best slurry performance. Water conditions such as water hardness, acidity, and alkalinity occur in city water, natural water, or can be caused by contamination from soil or cement.

The remedy is *Water Treat*, a pH conditioner from PDSCo. *Water Treat* or soda ash are recommended for pH buffering and softening of makeup water and prevent contamination from calcium and magnesium ions.

A good estimate for correction of Super Mud slurry is 1lb *Water Treat* to 200 gallons freshwater (0.5 kg : 800 liters) or 1lb *Water Treat* to 100 gallons (0.5 kg : 400 liters) of salt or brackish water.

Mixing

Surface Tank Mixing

Simply pour Super Mud through a venturi type mixer or pour slowly directly into rapid, turbulent moving stream of water filling the tank.

For mixing Super Mud *Dry*, slowly sift the granular directly into a stream of running water.

Surface tank mixing is recommended, especially on large scale projects, because properties of the slurry are more easily controlled.

Avoid the use of shear mixers or centrifugal pump if at all possible as over shearing will reduce viscosity.

Direct Mixing

Pour Super Mud slowly and directly into the stream of water allowing the stream of Super Mud to enter the water at the most turbulent point.

If Super Mud *Dry* is used, add slowly to avoiding lumping and wastage.

The auger should then be slowly raised and lower in the slurry column to distribute and homogenize the slurry; slow rotation can be used.

If a drilling bucket is in use, it shall be raised and lowered while rotating slowly.

Super Mud and Super Mud *Dry* can be mixed in a variety of different ways as showed in the pictures. Mixing is quick and easy and does not require expensive mixing facilities nor lengthy hydration times.

Testing & Control of Slurry Property

There are four main properties of a Super Mud slurry that require testing and control of slurry properties during use:

pH Test		This test is performed by dipping a piece of litmus paper (pH paper) in the slurry and comparing the color change to a standard chart. The result is reported in a number from 1 - 14: 1 - 6 is being acidic, 7 is being neutral, and 8 - 14 is being alkaline. The optimum zone for maximum Super Mud performance is 8–10. At this level, polymer molecules can fully hydrate and extend. Control pH with Water Treat or soda ash.
Marsh Funnel Viscosity		This test should be performed both initially and at frequent intervals during use of the slurry. This involves timing slurry flow through Marsh Funnel Viscometer. The time in seconds for a quart of slurry to pass through the funnel tip is reported as viscosity in second per volume. Viscosity is the measure of polymer concentration and its ability to stabilize surrounding soils. Mixing in additional Super Mud will increase slurry viscosity.
Density		This test is performed with a standard mud balance also known as the mud scale or density scale. It is reported as specific gravity, pounds per cubic foot, or pounds per gallon. Super Mud slurries, regardless of viscosity, have the same density as water, specific gravity 1.0 (± 0.05). If density is out of this range, polymer concentration could be too low. Viscosity testing should be taken to confirm this immediately.
Sand Content		This test is performed with a standard sand content kit, and the results are reported as percent sand. This test is normally performed at the finish of an excavation and just prior placing concrete. When using Super Mud slurries, the sand content will rarely test over 1.0% sand. Due to its flocculation ability, sand drops very quickly in Super Mud slurry and the slurry remains nearly sand free.

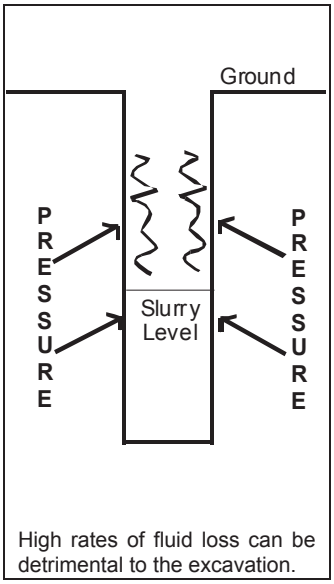
The slurry binds the soil together making excavating easy.

Clean concrete placement with minimum concrete wastage.

Unlike mineral slurries which leave seams of wall cake between concrete and soil, Super Mud slurries are instantly degraded upon contact with concrete creating a direct bond between existing soil and concrete providing greater friction bearing capacity.

Problems and Solutions

Fluid Loss



High rates of fluid loss can be detrimental to the excavation.

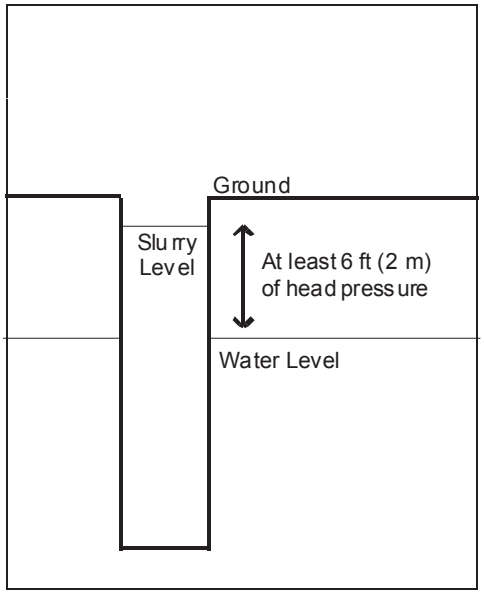
High rates of fluid loss can be detrimental to the excavation stability because migration of fluid through the side walls of the excavation can reduce cohesion of the surround soil, equalize pressure between the hole and the soil, increase potential for hydration of swellable clays and shales, and cause sloughing or collapse of the hole.

Options:

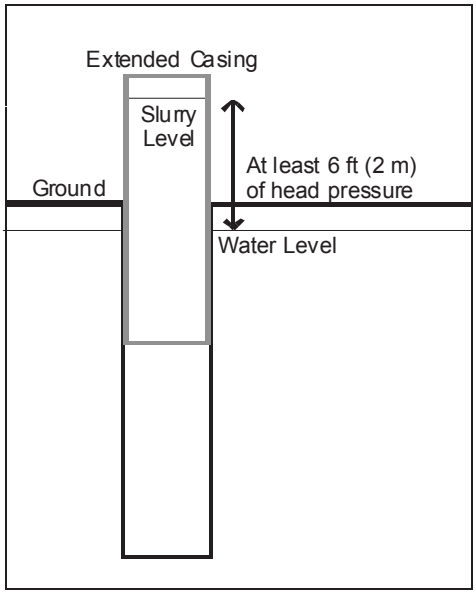
- Increase the polymer dosage and viscosity of the slurry by adding Super Mud or Super Mud *Dry* directly into the hole with water.
- Transfer premixed high viscosity polymer slurry to the hole from storage tank.
- Fluid loss control agents such as *Aquasorb* may be added to the existing slurry. (Use only additives developed for compatibility with the fluid in use).
- Natural silts which have already been removed from the excavation can be added directly into the top of the excavation or can be applied directly to the fluid loss zone by placing the natural silt on the auger. The auger should be rotated so as to spin the material off against the side walls of the excavation just above the loss zone. Granular Bentonite could also be used in place of silt.

Water Table

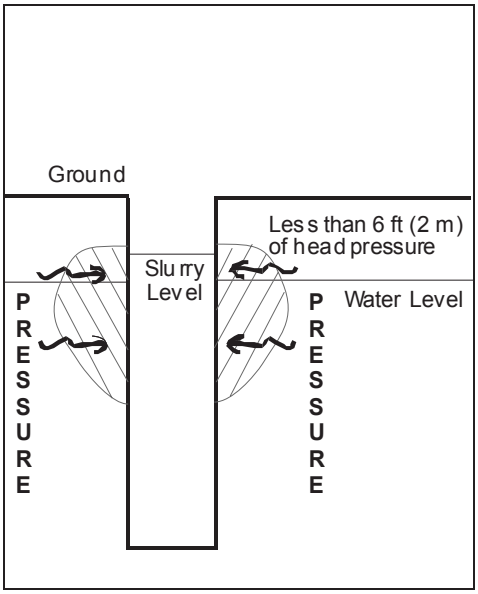
The slurry level should be maintained at least 6 feet (2 m) above the water table to balance hydrostatic pressure and to prevent collapse of unstable formation. If the slurry drop below this level, the operation should be paused and the proper slurry level reestablished by adding fresh water and polymer directly to the hole or by transferring premixed slurry from a holding tank to the hole. Surface casing use is always recommended.



A head pressure must be maintained at level of 6 feet (2 m) above water level at all times.



If water table is at grade, extend surface casing above grade to allow sufficient head pressure.

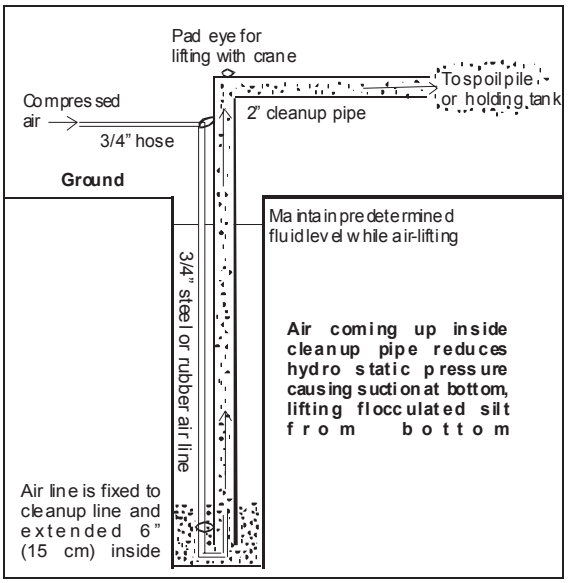


Failing to do so will result in the collapse of the wall from near the water level.

Preparing For Concrete Placement

Typical Cleanup

Upon reaching design depth, an initial cleaning of the bottom of the hole shall be effected with a flat bottom bucket or suitable equipment.



Air-lift Cleanup

Compressed air is blown into the cleanup pipe via an air line into the cleanup pipe 6" (15 cm) from bottom.

The compressed air travels upward through cleanup pipe, creating lower pressure in the pipe than the slurry column in the borehole. As a result, the slurry with the solids at the bottom of the borehole are sucked into the pipe due to the difference in pressure and travel out of the cleanup pipe together with the compressed air to the surface.

(As demonstrated in the right diagram.)

When near bottom and mid-point sand content and density reading are within specified range (or when the readings stabilize and show no further change over a 30-minute interval in which the hole is completely static), the bottom of the hole shall be cleaned and placement of rebar and concrete may proceed.

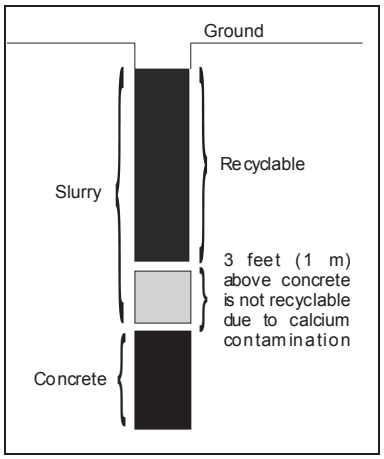
Slurry samples shall subsequently be taken intermittently from the midpoint of the hole and from within 2 feet or 0.6 meter of the bottom to determine viscosity, sand content, pH and density.

Recycling

Care should be taken not to pump any slurry back to holding tanks that has become contaminated from contact with the concrete. Contamination is very visible as it looks very much like clabbered milk or oatmeal.

The last 3 feet (1 m) of slurry above the concrete interface shall be diverted to a waste tank or pit.

The slurry collected in a holding tank should be tested for pH and viscosity, and, adjusted by addition of *Water Treat* or Super Mud for reuse in the next excavation.



Breakdown of Super Mud Slurry for Disposal

Upon completion of a job, any remaining Super Mud Slurries can be broken down with a chemical oxidizer. The most common oxidizer for this purpose is 5% Sodium Hypochlorite solution (household bleach). 3% Hydrogen Peroxide (household use concentration) can also be used.

The Hypochlorite solution should be added to the Super Mud slurry at a rate of 1 gallon to each 100 barrel of slurry to be treated. After the breaker is added, the entire system should be circulated to insure complete oxidation of all polymer molecules.

When breakdown is complete, all that remains is acrylate molecules and water. This is often safely discharged into sewer systems, percolated into the ground, or simply left to evaporate. Always check local regulations before disposal.

Usage Tables

Super Mud Dosage/Viscosity Ranges per Soil Type
(These values are not specifications. They should be used as guidelines in matching slurry to soil)

Formation Type	Super Mud Dosage or Concentration				Marsh Funnel Viscosity (sec/quart)
	vol/vol ratio	gal /1000 gal or liter/ m^3	lbs/cu yd	kg/m^3	
Clay & Shale	1/800	1.25	2.19	1.30	35-45
Silt & Fine to Medium sand	1/600	1.87	3.3	1.87	45-60
Coarse sand to pea gravel	1/400	2.5	4.4	2.6	60+

In applications where brackish, salt, or sea water contaminates slurry or is used in slurry makeup, dosage should be near top of given ranges, and developed viscosities may be lower. Treatment of makeup water and /or slurry with pH conditioners such as *Water Treat* or soda ash may be required.

Super Mud *Dry* Dosage/Viscosity Ranges per Soil Type
(These values are not specifications. They should be used as guidelines in matching slurry to soil)

Formation Type	Super Mud Dosage or Concentration				Marsh Funnel Viscosity (sec/quart)
	kg/m^3	lbs/cu yd	lbs/1000 gal	lbs/100 ft^3	
Clay & Shale	0.2 – 0.5	0.3 – 0.8	1.5 - 4.2	1.2 – 3.1	40 -50
Silt & Fine to Medium sand	0.5 – 1.0	0.8 – 1.7	4.2 – 8.3	3.1 -6.2	50 – 60
Coarse sand to pea gravel	1.0 – 1.5	1.7 - 2.5	8.3 – 12.5	6.2- 9.4	60 -80
Gravel to cobbles	1.5 - 2.0	2.5 – 3.4	12.5 -16.7	9.4 -12.5	80 +

In applications where brackish, salt, or sea water contaminates slurry or is used in slurry makeup, dosage should be near top of given ranges, and developed viscosities may be lower. Treatment of makeup water and /or slurry with pH conditioners such as *Water Treat* or soda ash may be required.

Volume of Water in Drilled Shaft/ Bored Pile

Diameter		Gal. per Ft. of Depth
Ft.	In.	
0	0	0.00
	3	0.37
	6	1.50
	9	3.37
1	0	5.91
	3	9.35
	6	13.24
	9	18.18
2	0	23.49
	3	29.99
	6	36.73
	9	44.73
3	0	52.88
	3	62.38
	6	71.96
	9	83.03
4	0	93.95
	3	106.59
	6	118.93
	9	133.07
5	0	146.83
	3	162.47
	6	177.65
	9	194.78
6	0	211.38
	3	230.08
	6	248.11
	9	268.31
7	0	287.76
	3	309.52
	6	330.32
	9	353.58
8	0	375.80
	3	400.63
	6	424.27
	9	450.60
9	0	475.65
	3	503.48
	6	529.96
	9	559.35
10	0	587.18
	3	618.15
	6	647.39
	9	679.86

The volume can be calculated with a simple formula:

$$\text{Radius}^2 \times \text{Depth} \times \pi$$

Radius= ½ Diameter
π = 3.14

PDSCo Drilling Additives

Quik Floc (Flocculent/Settling Agent)

Quik Floc is a selective mud flocculent which aids in the settlement of non-bentonitic solids. *Quik Floc* reduces the time required for settlement by rapidly agglomerating silt and other micron size particles that are suspended within the slurry and settles them to the bottom of the excavation allowing for easy removal by cleanout bucket or airlift system. Flocculation time will vary depending upon concentration of suspended fines.

- It can be premixed with the Super Mud slurries or it can be mixed directly in the excavation prior to cleanout.
- *Quik Floc* can also be used in bentonite slurries to reduce the amount of mechanical cleanout required.
- *Quik Floc* is salt tolerant and meets the same rigorous environment standards as Super Mud.
- 1 to 2 quarts *Quck Floc* : 4000 gallons of slurry to be cleaned (1 to 2 liters : 15,000 liters).
- *Quick Floc* can also be used in flocculating water, without the presence of polymer or bentonite slurry.

Aquasorb (Fluid Loss Control Additive)

Aquasorb, water absorbent polymer, is a crosslinked modified polyacrylamide which absorbs many hundreds of times its own weight in water and swells to form a durable crystalline gel. These gel particles do not dissolve, but continue to swell with time, making a seal in the pore spaces of formation; thus, eliminating fluid loss. For maximum results, every pound (0.45 kg) of *Aquasorb* should be prehydrated with three gallons (11.36 liters) of water about 10-15 minutes before introducing to excavation. Upon hydration, pour into excavation allowing hydrated polymer to migrate into loss zone. Repeat as necessary. Generally, one pound (0.45 kg) of *Aquasorb* per foot (0.30 meter) of diameter of hole will control moderate losses. For severe losses, this amount will require doubling to achieve complete seal.

Water Treat (pH Conditioner)

Water Treat is a pH conditioning additive which is designed to enhance the performance of the slurry. When added to a slurry, *Water Treat* increases the pH of the slurry and precipitates metallic ions, such as calcium and magnesium as insoluble carbonates, making them neutral or non-contamination. *Water Treat* is especially useful and necessary when acidic water is used, acidic soil or groundwater is encountered, or when brackish or saltwater condition exists.

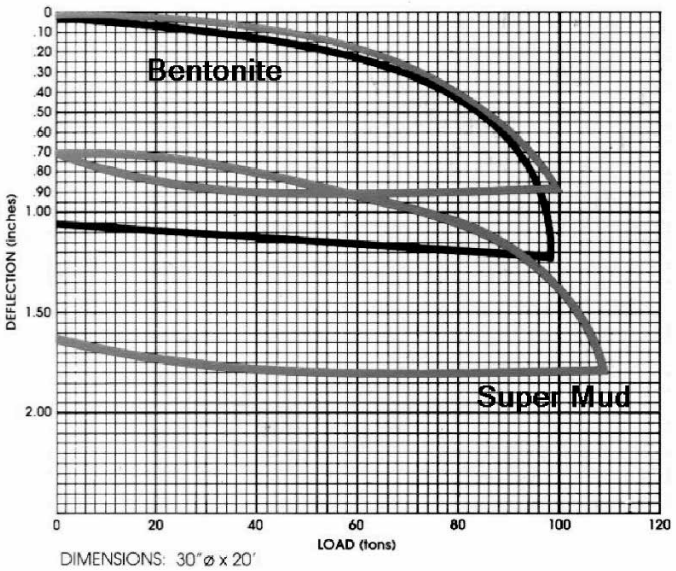
Before drilling operations are begun and prior to mixing of the slurry, the pH of the makeup water should be checked. On the pH scale, 7 is the neutral point, below 7 is acidic, and above 7 is alkaline. Super Mud and Super Mud *Dry*, as well as most other drilling fluids including bentonite, work best on the alkaline side. For use with Super Mud and Super Mud *Dry*, we recommend maintaining a pH level between 8 to 10 in fresh water and a pH of 10 in saltwater.

Water Treat should be added to the makeup water prior to mixing of the other slurry materials.

Recommended Usage		
Fresh water	1 lb : 200 gallons of water.	½ kg : 800 liters
Brackish/saltwater	1 lb : 100 gallons of water.	½ kg : 400 liters

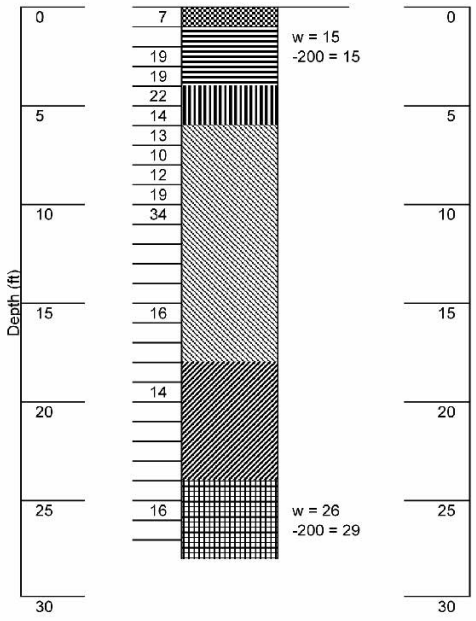
To mix, slowly sift *Water Treat* into the makeup water or slurry. pH of the slurry should be monitored throughout the drilling operation and *Water Treat* should be added as necessary to maintain proper pH level and buffer against contaminants. *Water Treat* can be added directly to the hole, in the slurry tank, or mud pit.

PILE LOAD TEST



DIMENSIONS: 30"ø x 20'

TEST LOCATION (HM-250)



Legend

- Gray to dark gray slightly silty fine sand with roots (SP/SM)
- Lt. brown to lt. grayish-brown fine sand to slightly fine sand (SP) (SP/SM)
- Brown to grayish-brown slightly silt to silty fine sand (SP/SM) (SM)
- Lt. brown slightly clayey, silty fine sand w/occasional orange mottling (SM)
- Lt. brown fine to medium sand w/occasional seams of lt. brown sandy clay (SP) (SC)
- Bluish-gray to gray slightly sandy to sandy clay (CH)

Project Overview

Contractor : Coastal Caisson Corporation
Location : Universal Studios, Orlando, Florida

The Universal Studios, Florida theme park is located in Orlando, Florida. The project consists of several separate structures housing various attractions associated with the film making industry. In five of the facilities, the structures are supported on a total of 141 drilled shafts, varying in diameter from 30 to 48 inches, and in depth from 15 to 28 feet. The shafts were installed using the wet-hole construction method, with Super Mud used as the drill fluid additive. The original project specifications required bentonite drill fluid to be used for drilled shaft installation. This specification was changed to allow use of Super Mud after a successful comparison load testing in tension of two similar drilled shafts. One shaft was installed using bentonite, and one was installed using Super Mud. The accompanying load test curves indicate a slight better performance of the drilled shaft installed with Super Mud.

Priority Pollutant Test Report

Super Mud contains zero parts per million of these EPA listed priority pollutants

Volatile Organic Compounds (624)

Acrolein, ug/kg
Acrylonitrile, ug/kg
Benzene, ug/kg
Bromoform, ug/kg
Carbon Tetrachloride, ug/kg
Chlorobenzene, ug/kg
Dibromochloromethane, ug/kg
Chloroethane, ug/kg
2-Chloroethylvinyl Ether, ug/kg
Chloroform, ug/kg
Dichlorobromomethane, ug/kg
Dichlorodifluoromethane, ug/kg
1,1 - Dichloroethane, ug/kg
1,2 - Dichloroethane, ug/kg
1,1 - Dichloroethene, ug/kg
1,2 - Dichloropropane, ug/kg
1,3 - Dichloropropylene, ug/kg
Ethylbenzene, ug/kg
Bromomethane, ug/kg
Chloromethane, ug/kg
Methytlene Chloride, ug/kg
1, 1, 2, 2 - Tetrachloroethane, ug/kg
Tetrachloroethane, ug/kg
Toluene, ug/kg
Trans -1, 2- Dichloroethene, ug/kg
1, 1, 1 - Trichloroethane, ug/kg
1, 1, 2 - Trichloroethane, ug/kg
Trichloroethylene, ug/kg
Trichlorofluoromethane, ug/kg
Vinyl Chloride, ug/kg
Xylenes, ug/kg

(Dilution factor: 50)

Base Neutral Compounds (625)

Acenaphthene, ug/kg
Acenaphthylene, ug/kg
Anethracene, ug/kg
Benzidine, ug/kg
Benzo (a) Anthracene, ug/kg
Benzo (a) pyrene, ug/kg
3, 4 - Benzofluoranthene, ug/kg
Benzo (g,h,i) perylene, ug/kg
Benzo (k) fluoranthene, ug/kg
Bis (2 - Chloroethoxy) methan, ug/kg e
Bis (2 - Chloroethyl) ether , ug/kg
Bis (2 - Chloroisopropyl) ether, ug/kg
Bis (2 - Ethylhexyl) phthalate, ug/kg
4-Bromophenyl – phenyl – ether, ug/kg
Butylbenzylphthalate, ug/kg
2 - Chloronaphthalene, ug/kg
4 - Chlorophenyl - phenyl ether, ug/kg
Chyrsene, ug/kg
Dibenz (a, h) anthracene, ug/kg
1, 2 - Dichlorobenzene, ug/kg
1, 3 - Dichlorobenzene, ug/kg
1, 4 - Dichlorobenzene, ug/kg
3, 3' - Dichlorobenzene, ug/kg
Diethylphthalate, ug/kg
Dimethylphthalate, ug/kg
Di-n-butylphthalate, ug/kg
2, 4 - Dinitrotoluene, ug/kg
2, 6 - Dinitrotoluene, ug/kg
Di-n-butylphthalate, ug/kg
1, 2 - Diphenylhydrazine, ug/kg
Fluoranthene, ug/kg
Fluorene, ug/kg
Hexachlorobenzene, ug/kg
Hexachlorobutadiene, ug/kg
Hexachloroethane, ug/kg
Indeno (1,2,3-cd) pyrene, ug/kg
Isophorone, ug/kg
Naphthalene, ug/kg
Nitrobenzene, ug/kg
N - Nitrosodimethylamine, ug/kg
N - Nitrosodi - N - Propylamine, ug/kg
N-Nitrosodiphenylamine /Diphenylamine, ug/kg
Phenanthrene, ug/kg
Pyrene, ug/kg
1, 2, 4- Trichlorobezene, ug/kg
(Dilution factor: 50)

Acid Extractable Organics (625)

2 - Chlorophenol, ug/kg
2, 4 – Dichlorophenlol, ug/kg
2, 4 - Dimethylphenol, ug/kg
4, 6 - Dinitro - 2 - methylphenol, ug/kg
2, 4 - Dinitrophenol, ug/kg
2 - Nitrophenol, ug/kg
4 - Nitrophenol, ug/kg
p-Chloro-m-cresol, ug/kg
Pentachlorophenol, ug/kg
Phenol, ug/kg
2, 4, 6 - Trichlorophenol, ug/kg

Pesticides/PCB's (608)

Aldrin, ug/kg
Apha - BHC, ug/kg
Beta - BHC, ug/kg
Gamma - BHC, ug/kg
delta - BHC, ug/kg
Chlordane, ug/kg
4, 4' – DDT, ug/kg
4, 4' – DDE, ug/kg
4, 4' – DDD, ug/kg
Dieldrin, ug/kg
Alpha - Endosulfan, ug/kg
Beta - Endosulfan, ug/kg
Endrin, ug/kg
Endrin Aldehyde, ug/kg
Endrin Aldehyde, ug/kg
Heptachlor, ug/kg
Heptachlor epoxide, ug/kg
Aroclor - 1242, ug/kg
Aroclor - 1254, ug/kg
Aroclor - 1221, ug/kg
Aroclor – 1232, ug/kg
Aroclor – 1248, ug/kg
Aroclor - 1260, ug/kg
Aroclor - 1060, ug/kg
Toxaphene, ug/kg
Cyanide (EPA 335.2), mg/kg
Antimony, mg/kg
Arsenic, mg/kg
Beryllium, mg/kg
Cadmium, mg/kg
Chromium, mg/kg
Copper, mg/kg
Lead, mg/kg
Mercury, mg/kg
Nickel, mg/kg
Selenium, mg/kg
Silver, mg/kg
Tahllium, mg/kg
Zinc, mg/kg
Phenolics, Total Recoverable (420.1) , mg/kg

PDSCo Testing Equipment

Marsh Funnel and Viscosity Cup
The Marsh Funnel and Viscosity Cup give an accurate measure of the drilling fluid viscosity.

Mud Balance
This scale provides a simple method for accuracy determining the mud density.

pH Testing Paper
The pH Test Paper is used to determine the pH level of the drilling fluid.

Sand Content Kit
This test kit measures the percentage of sand (by volume) suspended within the drilling fluid.

Fluid Sampler
The device allows the user to obtain a sample at any depth of the excavation.

Stop Watch
Optional.

All the slurry testing equipment mentioned above is available in a convenient carrying case to help keep all the pieces together. The carrying case is constructed of hard, sturdy plastic and has foam inside with designed cut spaces for the testing equipment to prevent breakage.

PDSCo Testing Equipment

1) Marsh Funnel
2) Viscosity Cup
3) Mud Balance
4) Fluid Sampler
5) Stop Watch
6) pH Testing Paper
7) Sand Content Kit
8) Case

PDSCo
POLYMER DRILLING SYSTEMS

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