NOH20 Grout

NOH2O (Scem66) was designed for the sealing of water with a ***high washout rate*** or ***high flow rate*** as well as ***high pressure***. No other grout performs as well as NOH2O and coagulation time as short as a few seconds is sometimes adequate to seal large flows, even under high pressures. Sovereign once sealed a leak with a flow rate of 166 Litres per second at a pressure of 180 P.S.I. This grout was also used to seal a leak with water pressure of 2465 P.S.I at a flow rate of 850 Litres per minute. NOH2O is extremely penetrable and once coagulated, extremely flexible. Future ground movement or shocks from blasting will not result in water leaking again, as may happen if only cements were used.

Grouting materials may be broadly classified according to the size of the contained solids. NOH2O can be classified as an emulsion grout. Particle size is less than 1 micrometer (+/- 0.6 nanometre). It contains no toxic or hazardous materials other than a preservative.

The activation of NOH2O may be achieved in three ways:

1. **Agitation**: If the NOH2O emulsion flows through a small orifice or narrow fissure, the high shear action causes the colloidally dispersed rubber particles to flocculate. These rubber flocks then start to adhere to the side walls of the orifice or fissure. Continued agitation causes additional flocks to form, which in turn adhere to the now rapidly coagulating mass of rubber particles, which builds up to clog the orifice or fissure until flow ceases. The rate of coagulation can be delayed by the addition of an inhibitor.

2. **Chemical Activation**: If the NOH2O emulsion is treated with a chemical activator, the emulsion becomes unstable and then coagulates to form a jelly-like plug of matted rubber laths.

3. **Exposure to Atmosphere**: If the NOH2O emulsion is exposed to atmosphere for any length of time it will dehydrate from the surface and form a thin skin of very fine interlocking rubber laths.

Method of Injection: NOH2O is injected into the water flowing in a crack or fissure via a hole drilled to intersect the crack or fissure for this purpose. A multi port injector is inserted into the hole through which the NOH2O is injected. As the emulsion flows with the water along the crack or fissure it will be activated by the turbulent agitation it encounters and a steady build up of coagulated rubber laths will occur which then form a seal. If the flow conditions dictate then a chemical activator can be injected, either downstream from the NOH2O injection point or at the multi port injector.

Whereas the addition of activator results in NOH2O becoming unstable, followed by rapid coagulation, the addition of an inhibitor increases the stability, thereby reducing its tendency to coagulate when subjected to agitation. This enables the emulsion to be transported for greater distances through the formation before coagulating. Injection pressures can be adjusted to suit the various requirements.

The activator and inhibitor are both true solutions and can be injected through conventional high pressure pumps. NOH2O is a hydrocolloid and although miscible does not form a true solution – and will therefore continue to disperse – like milk, resulting in a very penetrable substance.

Flexibility: Because of the flexibility of the rubber plug, the build up of water pressure behind the plug forces the plug tighter into the orifice or fissure thereby improving the sealing effect. NOH2O remains flexible and will therefore remain effective even when ground movement occurs, unlike other types of waterproofing that react to set hard and may crack during ground movement and allow leakage to resume.

Cost of the NOH20 water control system: Like any superior system, NOH2O is not cheap; however, the system is no doubt cost effective and is a non disruptive technology.

CONCLUSION

The treatment of methane and water ingress has and will always remain a major challenge for mining/tunnelling engineers and grouting specialists. Traditional grouting methods will continue to be used in the sealing of water inflows in much the same way that chemical grouts will continue to find application in the sealing of difficult water ingress situations. The chemical grouting experience Sovereign gained in deep level mines where extremely high pressures and large water volumes are the order of the day, is finding application in other parts of the world, solving technical and environmental problems associated with water ingress.

NOH20 has been successfully used in many different environments including the following

1. Water ingress in deep mines (Up to 4 Km vertical)
2. Water ingress in open cut mines
3. TBM and lined tunnels
4. Underground dam sealing
5. Shaft sealing / ventilation shafts / raised boreholes
6. Methane gas sealing
7. Underground military sites and bunkers
8. Silos
9. Basement parking garages
10. Bulkhead sealing
11. Underground waist depository sites.
12. Retaining walls
13. Joint and crack repair
14. Curtain grouting
15. Ore passes
16. Lift wells
17. Reservoirs
18. Pipelines
19. Water Plugs
20. Salt mines / salt domes with briny conditions.