

CLAYCRETE GLOBAL

STRONGER, BETTER ROADS & PAVEMENTS

Unique products that stabilise clay gravel and limestone soils into strong, permanent, load-bearing, water resistant pavements.

What is Claycrete™

Claycrete™ is a liquid chemical additive which reacts with only the clay fraction of a material. Long after the product has biodegraded the clay will remain in its stabilised state. The improved properties of the clay make it suitable for use in higher portions in road materials.

Clay has been stabilised in the past by the use of cement and/or lime but this process is expensive and application and mixing is difficult.

Claycrete™ is unique because the stabilisation does not depend on the presence of a residual product. After the reaction period is completed the stabilised clay is the remaining binder.

Finishing touches being applied to a treated road.

That is smoke pouring off the blade!



Purpose of Claycrete™

Many types of soils available through the world are a high in clay content and typically not considered suitable for road construction. Clay is prone to swell and shrink based on the absence or presence of water.

Claycrete™ resolves these problems by altering the clay particles on a molecular level, permanently changing the clay into an environmentally friendly binder of soil materials which no longer attract water.

Claycrete™ allows the clay particles to permanently break their bond with water. Once this happens, the clay particles can be compacted very tightly, binding all other soil materials.

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Suggested uses of Claycrete™

Subgrade stabilisation in road building

Subgrade and/or surface stabilisation for:

- Sealed and Unsealed roads
- Forestry and plantation roads
- Road shoulders
- Mine and quarry haul roads
- Landfill areas
- Aprons
- Subdivisions and housing project roads
- Workshop and garage floors
- Parking areas
- Farm dams and other water catchment areas
- Commercial and domestic driveways
- Cycle ways
- Loading areas
- Road train assembly areas
- Runways
- Canals
- Hardstands

Pressure injections

Dust minimisation



Claycrete™ product mixed with water and disbursed onto soil prior to grader mixing.



Grader mixing prior to more product and/or water alone to achieve optimum moisture content in the soil.



Job done. Very tight and stable surface that will not unravel like ordinary gravel roads do.



Benefits of Claycrete™

- ✓ Clay gravels are easier to find with abandoned pits re-used
- ✓ Clay gravels are cheaper to buy
- ✓ Due to high CBR's achieved pavement thickness can be reduced
- ✓ Treated materials are easy to work with
- ✓ To achieve optimum moisture content less water is required
- ✓ Claycreted materials require less compactive effort
- ✓ Claycreted unsealed roads require less maintenance
- ✓ Sealed claycreted roads also require less maintenance
- ✓ Seals adhere readily to claycreted surface
- ✓ Claycreted roads can be left longer prior to sealing

A well bound pavement is what every road builder aims to achieve because a road that is low in void will be strong and durable. Road builders in Australia most commonly use cement as a binder and this practice has been relatively successful, but it is too expensive to apply this solution to every problem or on a large scale.

Clay materials have compromised many road building projects because of their unstable nature when exposed to moisture. It is common practice to remove these materials from road projects often at great cost, just as it is common to stop digging when you encounter gravel with too much clay.

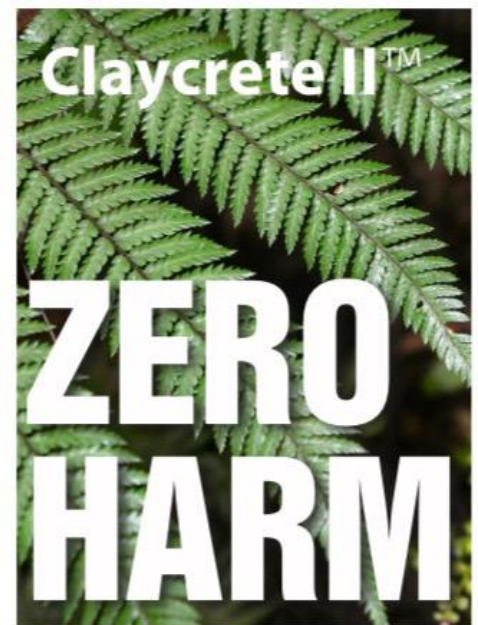
Clay can be used in many instances as an affordable binder in place of cement, but it must be stabilised to

eliminate the well known problems with the moisture.

In one treatment Claycrete™ stabilises clay, allowing the use of material that would have once been left behind or removed. The presence of additional clay reduces void and improves the binding of the pavement materials. Traditional specifications of low plasticity material impose costly limitations on material sources.

The costs associated with sealed and unsealed road networks can be reduced by healthy margins by tackling the age old problem of clay with new solution.

Roadworks that have been constructed using a clay gravel stabilised with Claycrete™ have improved noticeably in key areas.



SGS Certificate Achieves Highest International Standards

Established in 1878, SGS has become the world's leading inspection, verification, testing and certification company. SGS is recognised as the global benchmark for quality and integrity. With more than 85,000 employees, SGS operate a network of more than 1,800 offices and laboratories around the world www.sgs.com.

SGS has tested Claycrete II™ under OECD guidelines No 423: Acute oral toxicity Determination (LD50)...acute toxic method of the OECD guidelines for testing of Chemicals (2001) with a slight modification in terms of increasing doses.

Findings:

There were no negative results nor adverse discoveries in the laboratory trial conducted over a 3 month period.

Proud Results:

The permanent stabilisation of clay in soils with zero harm making Claycrete II™ environmentally sensitive and affordable.

Note: Imitations and similar products will not be able to produce this certification.





Why is Claycrete™ so unique?

Clay, which is made of microscopic platelets, is one of the most abundant soils spread throughout the world in different forms and mixtures with other sands and soils.

Over the centuries clay has been used all over the world to build homes, walls and roads but its inherent problem is the damage water brings to clay structures.

A dry clay construction can have powerfully strong qualities only to be undone when too much water is introduced to the clay by way of rain and flooded rivers which simply weakens the structure accordingly.

The shrink and swell characteristics of clay has most people in developed countries avoiding the use of a lot of clay in road building and constructions but the poorer nations have little choice but to build and rebuild repeatedly due to the lack of alternative methods within their ability to afford expensive combative additives.

Over the centuries and still today there are a huge number of additive products used to try and combat the shrink/swell in clay such as cement, lime, and a mixture of both, tree sap, polymers and even human and animal blood (The great wall of China).

The most widely used is the mixture of cement and lime which is added to the clay to stabilise the soil but the expense in most cases is exorbitant and the fact that both additives are water absorbent and/or become brittle can result in failure long before an acceptable life of the stabilised clay surface is reached.

Polymers too are used to fight the swell/shrink of the clay but this process tends to be an expensive process and needs periodical repeat of action. (Adding further to maintenance costs).

Polymers and cement/lime additives leave a residue of product in the soil from these treatments which is not acceptable to the friends of the earth. Until a product comes along that is environmentally friendly and leaves no residue in the soil we all have to accept this anomaly. BUT ... That product is available! ... Claycrete™.

Claycrete™ is a viscous liquid chemical which is mixed into the water that clay normally absorbs. Rather than trying to bind the clay platelets like the cement, lime or polymer bonding agents, Claycrete™ simply reacts with the clay platelets to cause them to magnetically attract more strongly to each other and less so to water.

Water molecules that are normally bonded to clay platelets become free and drain off. In essence the treated clay becomes impervious to water, thus providing a stronger bond, increased density, increased mechanical strength and a greatly increased resistance to water.

Claycrete™ does not leach and does not leave a residual product in the soil (when the chemical reaction has completed the transformation of the clay characteristic, the product becomes exhausted and no evidence left behind).

Claycrete™ is arguably the cheapest, hardest (High CBR's) and best clay stabilising product available with over 20 years of evidence of success in many countries in the world to support this.

Furthermore, the sister product to Claycrete™ called Kalfoss™ is the world's best limestone stabilising product.





Why clay is different to other soil types?

Clay is comprised of microscopic platelets which resemble small irregular pieces of paper.

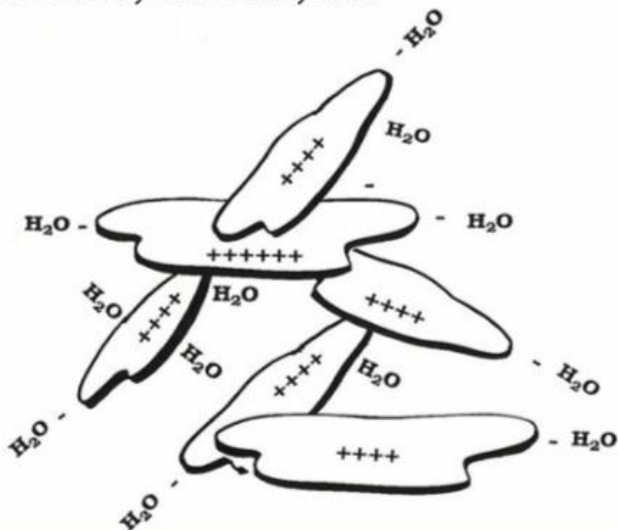
The pieces of clay (platelets) carry a minute charge which has a negative value on the edge of the platelet and a positive value on the face. In terms of the platelet's size the charge is strong and is responsible for the unusual characteristics of clay.

In dry clay the face to edge bond of the clay is strong enough to hold the clay together but the edge charge is more easily satisfied by bonding to water.

Water molecules are adsorbed onto the edge of the platelet and the more water that is present the less the platelets bond to each other.

If enough water is added the clay floats apart more and more until it has the characteristics of a colloid and ultimately a liquid.

This then is the annoying characteristic of clay that gives it swell and shrink problems and make it unreliable in any structural applications unless it is permanently fixed in a dry state.



Claycrete™ cures Clay

Claycrete™ is a viscous liquid chemical additive that is mixed into the water that clay normally absorbs and reacts with only the clay fractions of a material. This reaction fundamentally alters the clay.

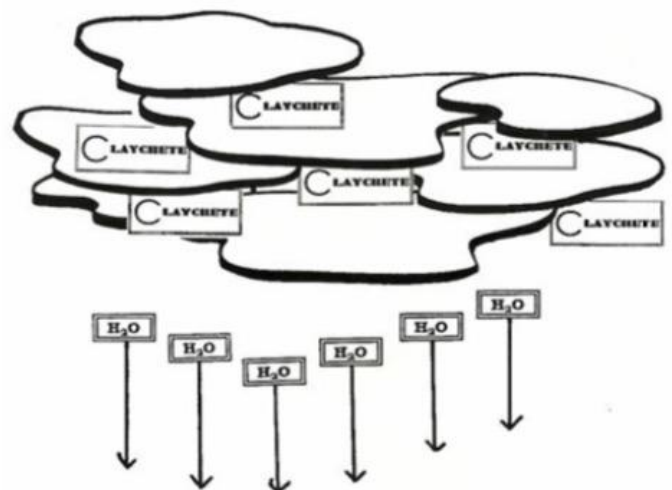
Long after the product has biodegraded, the clay will remain in its stabilised state. The improved properties of the clay make it suitable for use in higher portions in road materials.

The special formulation of Claycrete™ means that the clay platelets have a greater affinity for Claycrete™ than for water alone.

Claycrete™ satisfies the charge imbalance in the clay platelets and allows the random bonding of the platelets to be changed to a more orderly arrangement approaching a layered bond.

Water molecules which are normally bonded to clay platelets become free water and drain off.

The result of the treatment is a stronger bond, increased density, increased mechanical strength and a greatly increased resistance to water.



PROJECTS

Fire & Emergency Services of WA
Commissioned Claycrete Australia to build an
1800sqm helipad for Canada's \$24m Fire Water
Bomber located in Perth.

The water table was only 300mm below
surface but the 300mm pad of clay is
impervious to water and as solid as concrete
without the fear of cracking under load due to
the pliability of the clay.



Claycrete™ for sealed roads

Claycrete™ is compatible with road seals
and whether you seal now or in the future
you can be sure of a good finish if your base
course is Claycrete™ treated.



Claycrete™ for shoulders

Stabilisation of shoulders is a simple and
speedy process with Claycrete™ using a rotary
hoe, a grader, a water tanker and a roller.





Wet weather no longer ruins this road!

Completed projects

Big Bell Administration Road

Project: 11 kilometers of service road. Unsealed. 8 meter running surface. Base Course of 150mm to be constructed from in situ material.

Vehicles: Road trains of fuel and heavy loads of mine machinery used the service road. The road also linked the mine camp and the mine and was used extensively by light vehicles traveling at speed.

Benefits: Road was constructed using Claycrete mixed with in situ material. Dust had been a major problem and on the two curves of the road the surface had raveled so badly that two vehicles had slid off the road and rolled.

After re-construction there were no further accidents and the road was watered once each day to alleviate dust on the road which had blown from an adjacent waste dump.

Only light maintenance was required during the remaining five years of operation.

Robe River Iron – “Mesa J” Haul Road

Project: 3 kilometers of low speed haul road. Unsealed 20 meter running surface. Base Course 200mm.

Vehicles: Principal vehicle was Caterpillar 777 haul pack.

Benefits: Road had been dusty and required frequent re-sheeting and re-shaping. Vehicle maintenance reflected the poor road conditions with increased suspension failures and high tyre temperatures.

After reconstruction the road maintenance costs were reduced by 70-80% with no further re-construction required for the subsequent use of the road, a period of more than a year. Watering was continued because of dust that was blown from the haul packs with the increased operating speeds.

Because Claycrete resulted in a very high early strength the final trim of the road was done with a dozer. The Caterpillar 16G was unable to engage the surface and each attempt resulted in the grader spinning sideways.

Cuddingwarra to Big Bell Haul Road

Project: 18 kilometers of high speed haul road. Unsealed 8 meter running surface. Base Course 200mm.

Vehicles: Road trains of 47 meters with three trailers with two triaxles per trailer. Payload of 100tonnes and operating speed of 100kph loaded and unloaded.

Benefits: Road was priced at \$1.2m by the lowest bid for conventional construction, with 200mm of overlay material to reach the required pavement strength. Road was constructed using Claycrete and 100mm overlay. The total construction cost was \$638,000. In situ CBR readings were consistently above 120%.

Three days after practical completion the road was flooded by a rain bearing depression resulting from cyclone Vance. The road was under water for eight days and while flood crossings were still running the road was opened. Graders were put on the road to trim the surface to remove the wheel marks of one semi-trailer that used the road while flooded in order to get food to the mine camp. By the second day the graders were unable to cut the surface because the road was too hard. The heaviest of the graders burned a set of cutting edges in one afternoon and the graders had to be withdrawn.

During the next five years the road had minor maintenance and regular watering with no additional sheeting material.

The haul was 4,500 tonnes per day.

At the end of that period the mine was closed as the resource had been depleted.



Completed projects

Mount Kintyre – Air Strip Upgrade

Project: 1500m x 30m of 200mm stabilization of in situ material.

Vehicles: Various Light to medium aircraft. Including Pilbara Air Services regular supply flights.

Benefits: Pilbara Air Services had complained of high damage rates on propeller and fuselage from gravel thrown up from the loose surface of the airstrip.

The entire airstrip was upgraded using Claycrete to stabilize the laterite gravel.

Pilbara Air Services reported a reduction in prop and fuselage damage of approximately 70% as a result of the upgrade.

Mount Keith – Workshops Hard Stand Area

Project: To stabilize 200m x 200m area treated to 200mm.

Benefits: The area had previously turned to mud under rain and was very dusty in dry conditions. Mechanics complained that the working conditions were unbearable.

After treatment the area required occasional maintenance to remove the dirt that was knocked off the Haul Packs during service.

Gidgee Gold Mine

Project: Stabilise one kilometre haul road to waste dump. Stabilise ramps to pit.

Benefits: The road to the waste dump required frequent sheeting and shaping. It was slippery and soft. The pit ramps were so bad that when rain fell the drivers were instructed to abandon their haul packs as soon as rain started if they were on the ramp. All haul packs in the pit when rain started were to be left in the pit.

After stabilisation a dozer with spade tracks was walked along the waste dump road. The spades cut into the short stretch of untreated surface to a depth of 75mm and tore the surface badly. On the treated section it left a series of white marks on the road while the dozer walked on the spade edges without any measurable depression under the spades.

The ramps were treated and traction improved to the extent that a downshift on the ramp was no longer necessary.

The instruction to abandon haul packs on the ramp was removed.

Mount Keith Airstrip

Project: 2000m x 30m of airstrip for jet engine aircraft servicing the mine.

Benefits: The surface was reported as tightly bound and excellent finish to receive seal.

Hamersley Iron Mine – Rail Service Road

Project: Stabilisation of sections of the rail service road at the Karratha end.

Benefits: Much of the material on the rail service road was non plastic. The treatment was applied to materials of all types at the client's instruction.

The difference between non-plastic and plastic materials was clearly visible and vehicles driving on the service road could be seen to raise dust on the non-plastic sections. The sections with some clay responded well to the treatment and dust was greatly reduced. Little or no maintenance is applied to the rail service road.

Iluka Sand Mines

Projects: There have been numerous sections of haul road treated on the mine. The work has been carried out by North Coast Holdings and they have consistently reported substantial benefit from treating the clay/sand materials.

Hard stand areas for primary sorters have also been constructed using Claycrete. These areas are constantly exposed to water from the washing and sorting process. Without Claycrete the hard stands had required frequent sheeting and the sorting towers had to be excavated from the built up sheeting when it was necessary to move them.

Stages for storing over burden were also constructed using Claycrete to stabilize the floor so that recovery of the stored overburden was made easier and cleaner.

Another benefit of the Claycrete treated roads was the reduction of transfer of die back on the vehicle tyres.

Claycrete has ingredients that destroy the spores of the disease.

The Department of Conservation and Land Management have used Claycrete results to develop a treatment and defense against die back.

Argyle Diamond Mine

Project: Stabilisation of access road to the mine.

Benefits: The deterioration of the untreated access road was so rapid that the mine was frequently forced to delay fuel deliveries because of the risk of tank rupture on the rough surface.

On the first occasion the road was stabilized using Claycrete. The application was done progressively as part of the mine maintenance program.

The results were sufficient that the road was scheduled for sheeting and upgrade using Claycrete to maximize benefits from the new sheeting.

The upgrade was successful and the Turkey Creek Community became competitive contractors in the area for several years after.



