PolyCom Stabilising Aid

Betta Roads Pty Ltd
PO Box 40
Joondalup BC
WA 6027

08 94020504

Paul 0448 786191
paulb@bettaroads.com.au

Joe 0450 731995
info@bettaroads.com.au

2Kg’s treats 50 Cu M (Compacted) or approximately 100 tonnes
What is PolyCom and how does it work?

PolyCom is a truly unique Polymer concentrate, designed and engineered in Adelaide SA by Biocentral Laboratories. PolyCom has been used successfully across the whole of Australia since 2004.

During this time the product has become increasingly popular with road asset owners who recognise it as an economical and sustainable alternative to historical practices such as re-sheeting or the use of traditional binders such as cement or lime stabilisation. Previous attempts to use low quality polymers in conjunction with cement or lime has produced mixed results, relying on the cement or lime to give a benefit.

PolyCom has been purpose made for specifically for pavement stabilisation and is a consistent performer. PolyCom mixed with water produces long chain Co-Polymer strands, making the resultant Co-polymer liquor slightly sticky and have an oily consistency.

This sticky / oily liquor is a very good lubricant typically enabling soils to be more easily mixed to form a consistent, homogeneous soil which when compacted enables a high degree of densification with an appropriate amount of comparative effort.

Dry Strength / Stiffness
Once a high degree of densification has been achieved the soil particles are close enough together to enable the long chain polymer strands to form a three dimensional matrix linking to numerous different particles at once. Whilst individual bond strength of the strands is relatively low there can be more than 15,000 of these bonds per particle the overall bonding force is high and the air voids in between are kept to an absolute minimum. Ultimately, a treated section of road has a significantly higher dry strength (CBR) and better equipped to resist mechanical damage, water ingress and acts to absorb wheel forces more efficiently.

Soaked Strength / Stiffness
Once the treated and compacted pavement dries back the Polymer strands are difficult to rehydrate. A good analogy is that of an exterior water based paint. When wet the paint can be wiped off a surface with relative ease. However once the paint has dried back its is difficult to remove it from a surface due to the paint hardening as it dries.

Similarly PolyCom reaches its full potential once it has been hydrated, mixed with soil and the soils compacted to a high density and allowed to “dry back” leading to a situation were the now stronger pavement tends to retain a higher degree of strength / stiffness through wet weather.

Two examples of PolyCom treated pavements retaining structural integrity in situations where high rainfall and erosion have destroyed the untreated portion of the pavement. These treated sections continue to perform well
Product Application - Dry spread method

This method is particularly useful when materials residual moisture content is high, either close to or in extreme cases above their OMC. Basically the same as Rip and Re-compact however the product is spread over a previously scarified area, allowed to activate and then mixed by conventional means such as blade mixing with a grader.

**Equipment Requirements**
Grader with rear mounted scarifiers
Compaction - Appropriate compaction equipment
Water cart (Water cart should have pumped dribble bars and/or fan sprays)
Powder Spreader (supplied by Betta Roads)
PolyCom water soluble polymer (supplied by Betta Roads)

![Image of PolyCom application vehicle](image)

Scarify the designated treatment area to you predetermined depth.

Use pump spray to mist spray over the ripped area to be treated
Dry spread the PolyCom powder using a fertiliser spreader (supplied by Betta Roads)
Scarify again and add another pass with the water cart.
Set material up in a windrow / mix adequately whilst adding water to bring the material to modified OMC.
Lay out in 50mm lifts, rolling with appropriate compaction equipment in the conventional manner to achieve adequate compaction.

Whenever possible finish with a slurry seal. Once the pavement has dried back sufficiently the surface can be watered to form a thin slurry of fines on the pavement surface. Rolled appropriately with a multi tired roller a tight, uniform finish to the pavement surface can be achieved and will assist in the longevity of a dirt road and in the case of a pavement that is to be sealed achieve a dense, uniform surface. Additionally, as the Polymer has an anionic charge and helps to ensure a good bond between the treated soil and the bitumen seal.
Product Application - Pre-Mixed Method

Historically, this method has been used by construction crews across Australia for the past decade or so. Polycom is mixed into the crews water cart by use of an Educator which enables quick and efficient mixing of the PolyCom powder and water to form a resultant co-polymer, which is sprayed onto and mixed through the road material in the conventional time honoured fashion.

Equipment Requirements
Grader with rear mounted scarifiers
Compaction appropriate compaction equipment
Water cart (Water cart should have pumped dribble bars and or fan sprays)
Mixing Educator (for application of PolyCom to the water cart)
PolyCom water soluble polymer (supplied by Betta Roads)

Powder is mixed into a water cart at a predetermined concentration using a Educator. This is done as the water cart is being filled and once set up should not impede on the length of time taken to fill the water cart.
  Educator in action - large units available for larger projects

Once the powder has been mixed into the water to form a co-polymer then the product is used as if it were normal water and no deviation from common practice is required, basic Rip and Re-compact methodology applies

Premix PolyCom into the water cart
Rip predesignated area to the required depth
Spray ripped area with the PolyCom / water mix
Blade mix, spray and bring the full depth of material to OMC
Lay out in 50mm lifts rolling etc as required until adequate compaction is achieved
A slurry seal is recommended at the end of every treatment in order achieve best results.
Frequently Asked Questions?

What is PolyCom Stabilising Aid?
PolyCom Stabilising Aid is manufactured in Australia and is a granular polymer-based product that stabilises and improves the engineering properties such as strength (CBR) and water resistance of soil and gravel materials used in road construction and general earthworks.

Where can PolyCom be used?
PolyCom can be applied to stabilise and strengthen all roads (sealed and unsealed), road shoulders, subdivisional sub-grade construction, mining haul roads, railway sub-grades, embankments, transport hardstands and general earthworks.

What type of materials does PolyCom work with?
The PolyCom advantage is that it can be applied to wide variety of material types, including silt, clay, gravels and crushed rock at the one simple application rate so no complicated mix design is required.

Will pavements treated with PolyCom remain flexible?
Yes. PolyCom-stabilised pavements deliver comparable results to traditional stabilising methods with regard to strength but also remain flexible and resist shrinkage cracking and becoming brittle.

Will PolyCom help to achieve compaction in road construction and earthworks?
Yes. PolyCom typically enables higher more uniform densities with appropriate compactive effort, whilst reducing the optimum moisture content (OMC) of the material.

How is PolyCom applied?
PolyCom can be pre-mixed in a water cart or applied dry with a purpose-built spreader at the rate of 2kg per 50m³ (100 tonnes) of material. One 2kg pack of PolyCom will stabilise 500m² at 100mm depth.

How does PolyCom work?
After spreading and addition of water as required PolyCom works by binding the particles when compacted, thereby increasing water resistance and improving and preserving the dry strength of the construction material.

How can such a low application rate be so effective?
PolyCom has been designed so that it is transported and distributed uniformly throughout the material by water. Cross-blending or mixing the PolyCom treated material completes the distribution process. PolyCom also acts as a lubricant within the material aiding workability resulting in a denser, stronger pavement.

Can PolyCom be used for sub-grade improvement and capping?
Yes. PolyCom introduces water resistance and increased strength to sub-grades, delivering a more resilient and sustainable platform for your project. This produces cost savings through more economic pavement designs and drainage options. Sub-grade capping with PolyCom can substantially reduce re-work from weather or traffic damage in cut to fill operations, again reducing project costs.

Is PolyCom safe from an OHS perspective?
Yes. No special precautions or PPE are usually required (refer to MSDS) and no heavy lifting is required.
What about unsealed roads? Will PolyCom work with unsealed roads and will it reduce maintenance?
PolyCom is particularly suited to unsealed roads and will in fact reduce maintenance. PolyCom creates a tightly bound surface, reducing water ingress and therefore reducing sediment runoff. This means maintenance grading interventions can be reduced down to one quarter in most situations.

Do I need any special equipment to work with PolyCom?
No. Once spread with a PolyCom spreader, PolyCom is designed to easily blend with the material so that all that is required is standard road construction equipment, ie water cart, rollers (including a fully-ballasted, high tyre pressure multi-wheeled roller) and a grader. Another advantage for remote communities is that PolyCom-treated material can be blade mixed after addition of water to achieve adequate mixing.

Will PolyCom harm my machinery or paintwork?
No. PolyCom will not react with metal or paintwork and therefore will not harm construction machinery.

I want to buy PolyCom but how do I know what to do with it and how to use it?
Your PolyCom distributor will loan you a PolyCom spreader (also available for sale) or spread the PolyCom for new customers and trained PolyCom staff will provide on-site training and guidance to all new customers for as long as is required so that you obtain the best results from your purchase. Using PolyCom does not require additional personnel, onerous new skills or high-tech expensive equipment and will become a normal part of operations.

Will adding PolyCom delay my project?
No. The addition of PolyCom is not a factor in project duration, requiring only a few minutes to spread. After spreading, the road can be constructed as normal.

Can I use a stabilising machine to blend the PolyCom-treated material?
Yes. A stabilising machine can increase efficiencies and be cost-effective where long lengths and deep stabilising (in excess of 200mm) is required.

Does PolyCom have a finite curing time and can it be re-worked?
PolyCom does not have a set curing time. Strengthening of the pavement begins with compaction and as it dries following the addition of PolyCom. As such the pavement can be re-worked at any time should weather or other factors intervene. You will not “lose” the pavement nor the PolyCom. With PolyCom-treated roads, a maintenance grade is usually required after 12-18 months. This is effectively carried out by adding around 10% of the original PolyCom amount.

Can I mix PolyCom off-site and transport to the job?
Yes. Materials can be pre-mixed with PolyCom off-site and stockpiled until ready for transportation to site. Applications for this treatment include quarry materials (ie similar concept to cement-treated crushed rock), subdivision construction where material from elsewhere is required for level adjustment or additional strength, etc. Because PolyCom does not have any set curing time, it will not “go off” and materials can be stockpiled indefinitely and re-mixed as required. Leaching of PolyCom from the stockpile material will not occur.

Will PolyCom bulk up the stabilised layer and therefore I need to remove material from site?
No. The addition rate of PolyCom at 0.002% or 20 ppm is so low that no bulking of the stabilised material will occur so there is no requirement to dispose of surplus material.

How can PolyCom assist in mine haul roads?
PolyCom will reduce haul fleet costs by improving the running course strength, produce a more wearable surface and reduce rolling resistance in haul roads. PolyCom is also suitable for use underground.

Who is currently purchasing PolyCom?
Rural local government to create a more sustainable method of unsealed road maintenance, particularly through reduced gravel imports and reduced grading interventions. Rural and urban local government for patch stabilisation of failed pavement areas on environmental grounds in lieu of other materials. Land developers for sub-grade improvement and all-weather access roads to save excavation and crushed rock costs. Mining and energy companies to upgrade long-haul roads and reduce fleet running costs and road maintenance costs. Transport operators and industrial operations requiring a low-maintenance, all-weather access road and yard with the added benefit of reducing dust.
Pavement Testing in in situ material

Betta Roads typically follows up with a series of field tests for our clients FOC. This example shows different sections of a road in the Gascoyne Region. Predominantly the road was made up of old spent gravel material mixed with the in situ Pindan Sand material.

Some short sections having been treated with PolyCom produced higher strength readings within the depth of pavement and reduced material loss significantly.

The most encouraging outcome was that the PolyCom treated, spent material which comprised mostly of Pindan Sand returned the highest pavement strengths Resilient Modulus (Mr) 144MPa, 115% CBR and lowest material loss results. (less than 30% compared to the adjacent untreated sections)

This has obviously created significant economic advantages for the client. PolyCom treatment has enabled the option of treating in-situ material to produce a stronger more resilient pavement capable of taking a chip seal in subsequent years.

This option has been realised for minimal comparative cost. As more clients are choosing to treat poor quality in situ material such as Pindan Sand to produce a strong, water resistant more resilient pavement.

Betta Roads will be happy to come to site and conduct on site testing along with our client at the conclusion of the project when the pavement has been allowed to dry back sufficiently.

This service is FOC and we encourage our clients to use this service as often as possible.

Material loss kits are also available to our client FOC, we encourage feedback wherever possible.
CASE STUDY - MID WEST - GASCOYNE REGION

Good construction practice coupled with the appropriate use of PolyCom Stabilising Aid helped to ensure consistently good results were realised when constructing the Shires main arterial road. To date an estimated 80 Km’s of PolyCom stabilised pavement has been constructed and sealed in the last 6 years or so, along with various other applications around the Shire’s extensive road network.

Betta Roads has assisted the Shire wherever and whenever required in order to help ensure the best outcomes for both the Shire and community. We would like to think that there is a level of trust between us and our clients built on mutual respect and

Since construction, mother nature has tested the road with major flooding occurring in the area on at least 4 occasions that we are aware of. This photo helps to give an understanding of the benefit a combination of good construction practice and the incorporation of PolyCom Stabilising Aid can bring to a project.

CASE STUDY - GT SOUTHERN REGION

Grain Haul Route benefits from PolyCom Stabilisation

Due to the closure of the local rail network increased pressure has been placed on the road network within the Wheatbelt Region. Heavier traffic on grain haul routes has resulted in the premature failure of many of the regions roads and this is a situation that is not likely to change in the short term. In an effort to counteract the damaging effects of the increased traffic loadings some Shires are treating the underlying layers of their pavements to produce a stronger, more resilient pavement in this application it was utilised in the top 150mm of the base-course material to increase both stiffness and assist in insuring a good bond between the soil and bitumen was achieved on a 13km road widening project. A combination of Dry Spreading and the utilisation of a Road Stabilising Machine was used to mix the PolyCom through the soil efficiently.

The resultant strengths were impressive and the performance of the pavement has been particularly good. The PolyCom treated sections have not suffered from punching of the aggregate into the surface, therefore no flushing, bleeding, or stripping of seal have been observed on any projects.

Other untreated sections in the area which are not as well protected have failed which has lead to costly remediation work being required prematurely. This has prompted the local Shire to adopt the inclusion of PolyCom into this type of work as standard practice when undertaking works of this nature.
CASE STUDY - SOUTH WEST REGION

MRWA Shoulder Stabilisation

Shoulder damage can lead to dangerous drop offs, edge break, deformation and loss of shape which can accelerate the degradation of the pavement itself, if left unchecked.

Water ingress into the edge of the pavement and a softening of the pavement itself can lead to shoving, and ultimately pavement failure. Since good quality gravel is getting harder to source.

Non - Cohesive Gravel

Stabilising with PolyCom reduced permeability and increased shoulder strength and resilience

When a non cohesive gravel had to be utilised, PolyCom was chosen in order to ensure the gravel achieved the desired level of compaction and strength in both dry and wet conditions. PolyCom proved to be the easiest treatment option with the contractors choosing to use the pre-mix method.

By adding the prescribed amount of PolyCom into their first water cart load they made sure the full amount of PolyCom was added to the soil prior to mixing and balancing out. Then a quick tickle up and roll ensured this non cohesive soil met MRWA compaction requirements and has resulted in a hard wearing, long lasting, all weather asset.

Numerous sections of the busy tourist, trade and commercial routes have been treated with PolyCom and continue to perform well under traffic in both dry and wet weather.
CASE STUDY - Goldfields Esperance Region

AgLime Quarry Access Road

When its AgLime hauling season heavy vehicle traffic volumes increase significantly on our regional roads as farmers race to treat their soils before the seed drilling begins. Imagine then the increase in traffic to and from the AgLime quarries. Normally quiet dirt roads designed to service residents and the odd farmer going about their everyday business are turned into highways with disproportionate amounts of trucks travelling in and out of the quarry all day and possibly half the night.

When one of these access roads in the Goldfields - Esperance Region was deteriorating faster than the local Shire could maintain it and the road was considered too dangerous to use less than a fortnight after being reconstructed, PolyCom was utilised in order to reduce the mechanical damage causing premature failure of the pavement. Betta Roads was contacted mid-week, due diligence was done by Friday, Betta Roads was on site on the holiday Monday and work was started on the Tuesday morning. By Wednesday lunchtime the Shire construction crew was absolutely competent in the application process and with in a week the treatment was complete.

10 Km’s was ripped, PolyCom treated, reshaped and compacted to form a stronger, tighter, more resilient pavement. Using conventional equipment and saline water sourced from a local bay in order to increase productivity. The resultant pavement performed well with little or no maintenance required whilst the AgLime hauling season was underway. Subsequently the Shire has sealed the road through the Royalties for Regions Program to help fund sealing of the now sound pavement. So not only did the Polycom treatment perform sufficiently to get over the initial problem it has now been recognised to have adequate strength to take a seal and give a lasting solution to what was an emergency response application.
CASE STUDIES - KIMBERLEY REGION

Shoulder Stabilisation

PolyCom Shoulder protection has reduced scouring to an absolute minimum with the additional bonus of the extra densities and strengths not only reducing wheel damage but reports of less vegetation from the local Shire helping to increase the overall savings associated with the PolyCom treatment.

MineSite - Haul Road survives wet season

Savannah mine site haul road had to be reconstructed at least twice a wet season prior to being re-sheeted with PolyCom Stabilised soil. Material sourced on site and mixed with PolyCom formed a haul road that did not require any appreciable maintenance for 3 summers and 2 winters. No further requirement for PolyCom has been needed for the last 5 years or more.
CASE STUDY - PILBARA REGION

Major Project Access Road

PolyCom was the preferred option when considering how to get over the re-occurring problem of maintaining this site access road in the Pilbara. Heavy traffic, poor soils and wet weather can wreak havoc on dirt roads, especially when they are in a flood plain and lower than the surrounding natural ground levels.

This is not an isolated incident, roads like this predominate throughout the more remote regions of WA. PolyCom was included in the intervention grade due to repeated complaints from road users. The standard dosage rate of 1 bottle to 50 Cu M of pavement material was adopted and the results speak for themselves.

PolyCom Stabilising Aid has been used repeatedly on many different projects throughout the Pilbara Region in various different types of soils and with varying degrees of traffic loading. All the projects have been successful, all our clients have chosen to use the PolyCom product repeatedly and have continued to seek our services on an annual basis.
PolyCom General Specification

**Technical Classification**

- Synthetic Polymer Soil Binder

**Suggested Dosage rates - Wet or Dry**

- 20 Parts per million / 50,000:1 / 0.002%
- One x 2Kg Bottle treats 50 Cu M (Compacted)

**Benefits of use**

- Increased strength while remaining flexible
- Better Workability
- High Water Resistance
- No cure time restraints
- Always Re-workable
- Treated soil can be stockpiled indefinitely

**Applications**

- Sub-grade strengthening
- Pavement Stabilisation
- Stabilisation of Formations, embankments etc.

**Stabilised Pavement Classification**

- Modified

**Environmental**

- Dept of Health WA
- Approval for use in Water Catchments
- “ECO Buy” approved
- Complies with Strategic Cropping Land Act

**Testing**

- Contact Betta Roads for Laboratory Procedure

**Carbon Footprint Comparison**

- PolyCom Stabilising Aid has undergone an independent Australian Government Approved Carbon Audit, with several different examples being published in the form of Case Studies.
- Contact: Betta Roads for more information

**Plant Requirements**

- No specialised plant or equipment

**Hazard Classification**

- Non-Hazardous Substance
- NON-DANGEROUS GOODS
- Infosafe No./ LPWGU

**Supply and distribution WA**

- Betta Roads Pty Ltd
- PO Box 40
- Joondalup BC
- WA 6919
- 08 9402 0504 or 0448 786191
- paulb@bettaroads.com.au

**Physical Appearance**

- Blue / Green crystalline Powder

**Handling and Safety**

- As per MSDS