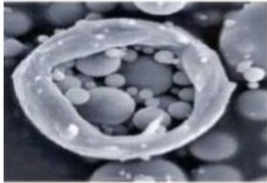


# RoadCem Stabilisation for Low Maintenance Long Term Durability in Construction Compounds and heavy duty Access Roads

## RoadCem Technical Explanation

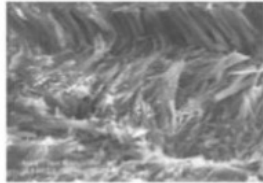
The **MINERALOGICAL** Effect of the Nano Technology due to PowerCem

Traditional Stabilisation



Cement glues particles Together "Brittle"

With added PowerCem



Formation of interlocking strings wrapping the grains "flexible"

Morphology of Nano modified concrete at Nano scale, using AFM (atomic Force Microscopy) to visualise the elements that are formed, which are contributing to the special characteristics at Nano scale.

**High tensile strength and breaking strain without thermal cracking**

When RoadCem is added to cement, it rapidly increases the reactivity of the cement creating a high energetic value, which during hydration results in extensive increase in crystallisation, filling voids and forming a dense, flexural mass.

RoadCem a mixture of noble-metals (e.g. Aluminium), non-noble metals (e.g. Magnesium) and synthetic Zeolites which combine to give a synergetic reaction to the formation of stable crystalline structures. Bonding together homogeneously and distributed with uniformity throughout the stabilisation.

With cement alone the more open and brittle structure which is formed, leaves the stabilisation vulnerable to impact and heavy or repetitive load damage. As unevenly distributed crystalline agglomerations, can lead to brittleness and internal stresses causing differential bonding within the structure.

The homogeneous distribution created by RoadCem is stable and strong. With maximum reaction of the of the cement, a crack and leach free monolith is formed. Any available water is bound in and to these crystalline structures. With no free water all potential weak spots are eliminated and the mass becomes impermeable and frost safe.

The resulting mechanical properties of RoadCem soil concrete stabilisation are therefore far more predictable and measurable. Using multi-linear elastic modelling, our design engineers Rodgers Leask can calculate final strength, longevity and loading capacities with confidence.

This allows for thinner RoadCem stabilised layers saving cost, materials and construction time.

RoadCem Zeolite soil concrete stabilisation has a high bearing and impact strength providing a safe working platform for heavy plant.



As RoadCem stabilisation is a totally recyclable technology its use in the UK has been mainly for temporary structures: access roads, compounds, crane and piling platforms. Therefore in the majority of projects these temporary installations have already been milled back to soil.

To prove our claims of durability we have in this document, included two RoadCem applications that have been in continuous use for long periods, with one example for thirteen years.

As Lime, cement and other stabilisation technologies all need protective surfaces or sealants to be truly effective for construction use. We are often requested to add add layers of stone or gravel and whilst this is not needed, it can aid traction for certain applications and we can offer this as an additional option.

As RoadCem is a main stream highway construction method in many other countries. We know it is quick and cost effective to apply a thin layer of asphalt directly to the RoadCem stabilised soils for roads, compounds and car parks requiring blacktop surfacing. Whilst this type of road is not to current full Highways England specification, it will perform as well if not better than a traditional road construction design at a fraction of the cost.

## Proven Long Term Durability in The Netherlands

RoadCem manufactured in Holland by PowerCem Technologies has been available worldwide for over twenty years.

One of the earliest applications was at Moerdijk Harbour, close to headquarters in The Netherlands, where a stabilised soil hard standing for containers and plant was constructed in-situ, from local soils and dredged harbour silt.

Used without any protective surface since 2005. This working compound has proved extremely durable with any impact damage quick and simple to repair by cutting out the damaged section and filling with RoadCem bound soil materials.

RoadCem is a product specifically designed to engineer superior tensile strength and impermeability in to soils, providing superior long-term durability.

Allowing the platform to be used un-surfaced and virtually maintenance free for long term temporary works.

These photos were taken in 2018, shortly before the facility was redeveloped as part of the new Moerdijk port extension.

As with all temporary RoadCem soil structures, all materials were 100% recyclable and were milled back to soil for reuse on site.



## Proven Long Term Durability in The United Kingdom

RoadCem was introduced to the UK in early 2012 and used for the construction of heavy duty working platforms and piling platforms for the award winning Costain/Atkins Walton on Thames A 244 road bridge.

Construction from the existing alluvial river bank soils, RoadCem allowed construction to take place with no requirement for imported stone or any surface protection. Making the entire stabilised area 100% recyclable.

Following the very successful Severn Trent Clay Mills STW stabilisation project in 2012, RoadCem was also used for the Anglian Water Cambridge STW project in 2013.

Once again RoadCem was used to treat the existing site soils, with nothing removed and no stone required.



This photograph taken in 2015 shows a section of the sites heavy haul road after two years use by construction traffic and heavy tracked vehicles.

Apart from bits of soil dropped by vehicle tracks the unsurfaced RoadCem soil stabilisation is in excellent condition.



This photograph taken five years later in January 2020 of the same section of RoadCem soil stabilisation. Shows that little change to the condition of the RoadCem stabilisation has taken place, perhaps the original stabilisation could have been given a greater degree of grading to prevent any water puddling taking place.

For long term temporary access roads and compounds such as required for the HS2 project.

RoadCem is the sensible solution for total cradle to cradle sustainability and value.

## Longevity without Maintenance for Airport Runway bases

Runways and Taxiways built with RoadCem for Terminal 2 at Jalisco Airport in Mexico were the subject of extensive durability analyses.

The full report can be found on our web site at the following link: <http://www.powercem.co.uk/wp-content/uploads/2016/01/AIRPORT-T2-GUADALAJARA-JALISCO-uk-VERSION.pdf>

Below are the first and last pages of this report which states that using RoadCem stabilised soils will increase the life of the runway from 39.3 years with granular materials to 2309.6 years with RoadCem.

León, Guanajuato. 4 October 2011.

**Attn. Ernesto Gerardo Orozco Escoto (Engineer)**  
Project Manager

Dear Mr Orozco,

We wish to inform you below of the results obtained in the Office on Geotechnical Study Analysis/Soil Mechanics Analysis on Behaviour of Pavements by the Simulators FAARFIELD and COMFAA, in addition to the analysis and recommendations for the foundation for "Airport Terminal T2 of Guadalajara, Jalisco", which will be built in Guadalajara, Jalisco, Mexico.



I have nothing further to report at the moment, but for any clarifications with regard to this report, please do not hesitate to contact me.

Alfonso Rafael Ayala Pérez  
(Engineer)

Page 56

### Conclusions

#### CONVENTIONAL STRUCTURE

Pavement designed with granular materials has a useful life of 39.3 years with a CDF = 0.51.

Pavement designed with granular materials has a PCN - 64 / R / B / X / T

#### STRUCTURE WITH SYNTHETIC ZEOLITES

Pavement designed with materials modified with synthetic zeolites (RoadCem or PowerCem) have a lifetime of 2,309.6 years with a CDF = 0.01.

Pavement designed with materials modified with synthetic zeolites (RoadCem or PowerCem) has a PCN - 64 / R / A / W / T

Pavement designed with synthetic zeolites significantly extends the useful life of the structure, in addition to having the ability to receive larger aircraft.