

DuralayRoads
International

DURALAY

SOIL STABILISER

FOR ROAD BASE

COMPACTION

EXCEPTIONAL PERFORMANCE
SINCE 1984

Low Cost Roads That Last

▲ ABOUT Duralay Roads International

THE Company

Duralay Roads International has been operating worldwide since 1984 in the sole manufacturing and distribution of Duralay soil stabiliser, which produces high quality, durable, low cost roads. We have been appointed for many turnkey and joint venture road construction projects and have used Duralay soil stabiliser in many countries all over the world.

We pride ourselves on the fact that the roads we have built in high rainfall areas in the mountains back in 1985 are still in good condition. Duralay soil stabiliser has been tested with similar products from around the world and has shown best results. Our product can be applied to all kinds of soils; it has proven effective in various climatic conditions and comes with a 15 year guarantee.

OUR Guarantee

Duralay is a product which will significantly improve quality and reduce costs. It increases the bearing capacity which can be quantified in terms of the California Bearing Ratio. Duralay has shown to be effective in full scale road works as a compaction aid and stabilizer due to its ability to increase the density of the soil forming a "harder" and more permeable layer, therefore creating a more weatherproof road.

X-RAY Diffraction

By using a combination of Electro-chemical and X-Ray diffraction testing, Duralay is guaranteed to work. This is the main technique for the identification of minerals in soil and crushed rock samples. Although not fully quantitative, it is never the less possible to estimate fairly accurately the amounts of many minerals such as quartz, feldspars, calcite, etc.

The work so far has concentrated on the analysis of whole soil samples prepared as random powder. In most samples this preparation procedure does not allow for the identification of specific clay minerals; in many cases their presence can be noted or anticipated from the mineral assemblage which can indicate the stage of weathering the material has attained from work conducted in the field and in the laboratory.

Our engineers come from both a chemical and civil engineering background with years of experience using Duralay. We can provide both technical advisory support in the design and planning stages through until field application completion.



▲ OUR Solution

THE Problems

Today in many developing regions there is a general shortfall in resources required to provide the traveling public with a suitable road network. Many of the problems have come from cuts in government funding as well as a lack of knowledge in new road development methods. This situation has forced a re-evaluation of conventional road design standards and construction methods.

Faced with these problems, many engineers have to specify the use of substandard or modified gravels on many roads. This however leads to additional problems particularly on gravel roads such as:

- Increased level of service problems related to general surface deteriorations, such as rutting and potholing - caused by poor materials and heavy loads.
- Safety, health and environmental problems related to dust or loose gravel materials.
- Maintenance problems related to surface durability under wet and dry conditions.

CAUSES of Failure

- Water
- Poor drainage
- Deterioration of shoulders
- Expansive minerals in the soil

SOLUTION

To overcome some of the problems, road engineers have recently embarked on a series of trial evaluations using additives in pavement layers and gravel wearing courses. These are:

- The use of synthetic additives to modify existing gravel wearing courses and in-situ materials to improve the durability and load capacity.
- The use of synthetic additives in conventional surfaced road pavement layer with a resultant cost benefit.



▲ ABOUT Duralay Soil Stabiliser

DURALAY is an environmentally friendly, liquid chemical compaction & stabilizing medium which when added in small volumes to natural aggregates/soils and gravels results in considerable improvements in the physical properties of the compacted material thus enabling low cost durable roads to be constructed with a reduction in compactive effort.

Duralay surfaces are suitable for main and secondary rural, municipal and urban roads; runways; freeways; helipads; parking areas and anywhere that a good bearing capacity is required to take heavy vehicle traffic. Duralay affects gravels and soils as super plasticizers affect concrete materials. It increases the density of in-situ materials and stabilizes the clay in the material, improving the strength characteristics of the compacted soil (C.B.R.* increases of 100% - 300%) and resulting in costs savings of up to 75%.

HOW DOES DURALAY WORK?

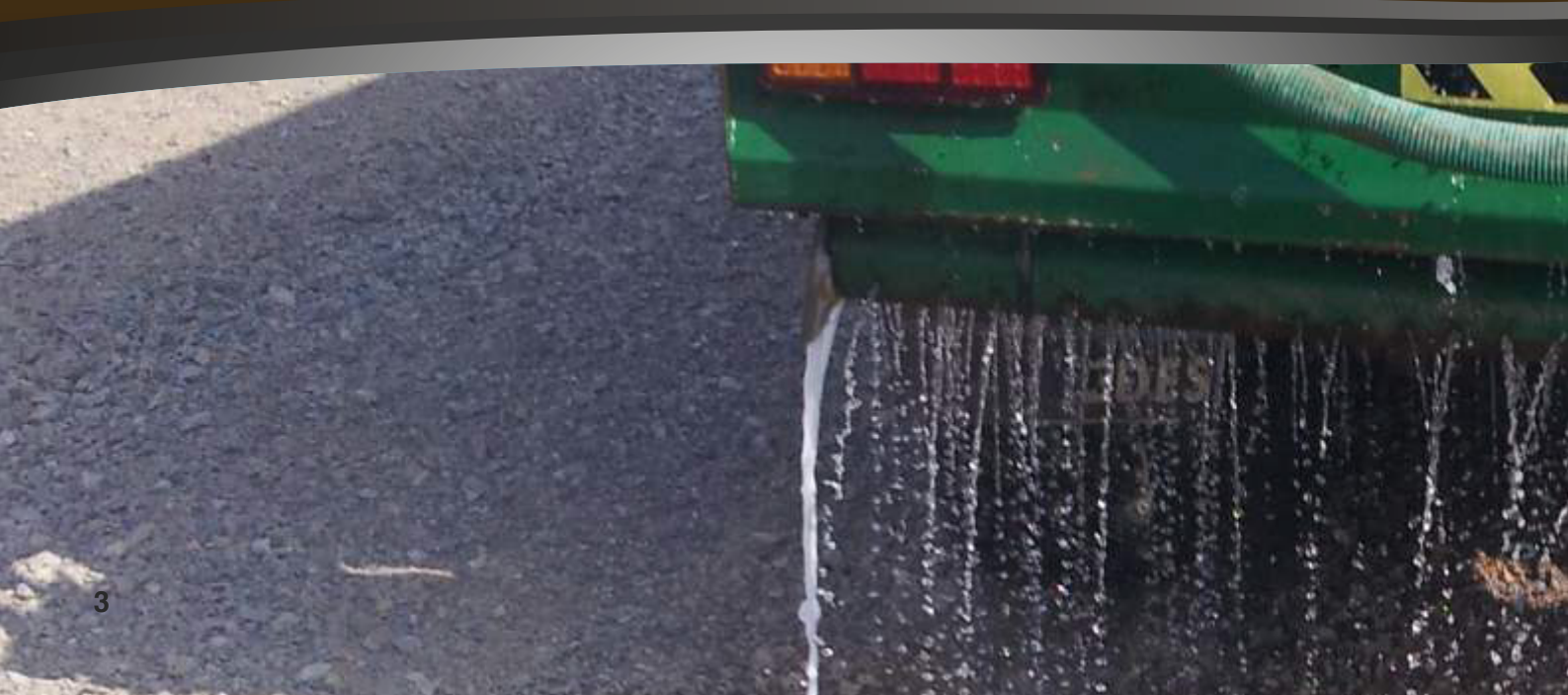
- ▮ **Acts as a compaction aid in all natural gravels and soils.**
- ▮ **Acts as an ionic stabilizer in the clay fraction of proven natural gravels and soils.**

When applied to the soil Duralay has the effect of increasing the compactibility of soil. Compaction in the field is greatly improved using Duralay and conventional compaction methods. This in turn increases the bearing capacity and at the same time forms a more impermeable layer than could be expected of the untreated material. The compaction is made easier due to its super plasticizing effect and its ability to reduce the moisture held by surface tension. The ion exchange is highly reactive in clay minerals because of a high surface area and charge (Ionic substitution).

They therefore have an exchange capacity, which enables Duralay to not affect the clay structure, but just the clay properties. The reactive minerals include montmorillonite, smectite, vermiculite and illite.

Their presence, with the addition of Duralay will enable the engineer to obtain high densities of 100% + MOD AASHTO. This is achieved by closing in the air voids and coating the soil particles thereby stabilizing minerals and rendering them inactive.

*The California bearing Ratio (CBR) is a test which is used widely as a means of estimating the bearing capacity of road building materials - higher CBR values indicating higher bearing capacities.



▲ CHARACTERISTICS

DURALAY, by lubricating the soil particles on compaction, binds the particles closer together filling up the voids and attaining more strength and higher densities. Poor materials (or soils) that one would not have normally used would have been removed in the past, but can now be used and are upgraded with the use of Duralay soil stabilizer. Duralay should be applied in layers of 150 - 200mm.

With clay type materials an iron exchange takes place which neutralizes the clay (stops any movement of the soil).

Once again these clay type materials would under normal conditions be either removed or bridged over by importing several layers of good gravel material from a quarry which proves very costly.



DURALAY Properties

pH	:0.8
Specific Gravity	:1.07
Colour	:Clear
Viscosity CPS	:635

ADVANTAGES

- Substantial savings on construction - up to 75%
- Virtually a waterproof surface-roads reach higher density with same compactive effort
- Increased density of in-situ materials and stabilisation
- Improves the characteristics of the compacted soil
- Improved compaction and wear resistance on unsealed roads

USES

- Sub base, sub grade or base coarse layers
- Urban, rural, access & municipal roads
- Road and trail development
- Erosion control & dust control
- Freeways
- Parking areas
- Helipads
- Landing strips



▲ METHOD of Construction

Chemically stabilized low cost roads using in-situ soils & gravels for road base compaction:

1. Mix DURALAY stabilizing product into water tanker at suppliers specified dosage.
2. Remove any wind blown sand or inert materials plus grass with a grader, by scraping the road to be treated.
3. Cut material (Soil) to form drain from both sides of road towards centre line therefore lifting road.
4. Pre shape road removing any slacks & bumps, cutting shoulder material onto road.
5. Rip proposed road base layer with grader to a depth of 15/20 cm thickness.
(15cm is the generally recommended layer of thickness)
6. Spray ripped material with DURALAY application evenly over area with water tanker.
7. Mix application uniformly into base material using Motor Grader, Disk Plough or Rotavator.
8. Add additional water to base layer to obtain OMC (Optimum moisture content) as required.
9. Re-shape road to required profile with Motor Grader 2-3% camber.
10. Compact layer with Grid or Padfoot & finish off with Vibrating Roller Smooth Drum & PTR.
11. Curing of layer with frequent spraying of water is recommended for 3 or 4 days for surface.



SOIL Sample

By sending us soil samples, we can analyze your material and cross reference with our past experience to insure optimum results. Soil sample should be taken from the central area of the road (if there's an existing road) and it must penetrate minimum 50 mm below the surface soil. We would need 1 kilogram sample for a Plastic Index (PI) Test.

Other samples may be required if there is a change in material type in certain areas, or for a California Bearing Ratio (CBR) test, which measures the load-bearing capacity of the soil. If required, the CBR test can be done later at a soils laboratory in the road construction area.

- Minimum Depth – 50mm
- Quantity – 1 kilo for a Plastic Index (PI) Test.
- Area – Centre of road (if existing road)
- More samples needed for a CBR test or wherever there is a change in material type.

APPLICATION Guidelines

A number of points should be noted with regard to the application of Duralay and the water solution:

- The recommended application rate of Duralay is 200ml per cubic meter. This equates to 30 ml per square meter at a depth of 150mm.
- Water puddles should not be allowed to form on the road surface as this may cause local saturation of the material
- The moisture content of the soil is important and during the compaction process should be maintained to the particular material's Optimum Moisture Content (OMC) – 1% below optimum OMC.
- Care must be taken that the correct compaction method is applied so as to achieve the highest level of compaction. The benefit of this is an increased bearing capacity.
- Over-spraying or over-lapping should also be avoided to ensure correct coverage and dosage rates.

MACHINERY Required

Machinery required for stabilization of layers (15 – 20cm thickness):

- 1 Motor Grader
- 1 Water Tanker
- 1 Pad foot Vibrator Roller or Grid Roller (Optional)
- 1 Smooth drum 10 Ton vibrator Roller
- PTR Rubber tyre roller (12 ton)

TECHNICAL Support

Duralay Roads International provides a technical advisory service supported by a team of specialists in the field.

The service includes on-site assistance, technical advice & training on evaluation trials and laboratory work.



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