DURAMENT - Cement Additive

Durable Polymerized-Cement

In-situ Soil Stabilization

Reliable Infrastructure

Reduced Greenhouse Emissions

Product Introduction

DURAMENT

here to stay

ABSTRACT

In-situ stabilization techniques have long been used by engineers in Australia and many places throughout the World for pavement construction and rehabilitation. Such techniques have historically been chosen predominantly because of their significant cost savings.

However, with the advent of green-road sustainability systems for roadway design and construction, and with need for reliable infrastructure, there naturally exists a growth expectation for stabilization products such as **DURA**MENT. Focusing on both the benefits of pavement stabilization and taking into consideration the social and environmental benefits of using in-situ material., **DURA**MENT is poised to be leader in the field of durable polymerized-cement.

The need for quality construction aggregates for buildings, roads, utilities, and transportation infrastructure construction and associated maintenance continues to grow across Canada, and around the world, placing ever-increasing demands on non-renewable aggregate resources (pits and quarries), fuels and binders (asphalt cements and Portland cements). At the same time, there is also increasing waste management environmental pressure to keep all potentially reusable and recyclable materials from taking up valuable space in ever-scarce landfills and pressure to reduce energy consumption and green house gas emissions. Canadian municipalities spend $12 to $15 billion annually on infrastructure but it never seems to be enough. Existing infrastructure is aging while demand grows for more and better longer-lasting roads, responding to higher standards of safety, environmental protection as well as population growth.

In the past 25 years, there has been considerable interest in developing new construction materials incorporating in-situ materials.

The reuse and recycling of materials from road construction and maintenance activities, has and continues to make a modest, but significant, contribution to aggregates conservation and reduced landfill disposal requirements in Canadian municipalities. Where landfills are still accepting construction materials from road construction, the cost of tipping fees has risen substantially, and there is increasing pressure to keep all potentially reusable and recyclable materials from taking up limited landfill space and to conserve aggregate resources.

"Generally this was by far the best polymer product used by Road Services of the last few years. I would encourage the client to consider the use of this product when working under traffic to minimize wet weather risk."

The advantages of using in-situ stabilization techniques to upgrade or recycle existing materials in deteriorated pavements, thereby rehabilitating the pavement as a whole, are found in the benefits derived from: (1) Direct costs benefits (time saving, material saving, labour saving), (2) Social benefits (ie speed of construction and lack of disruption) and (3) Environmental benefits (conservation of quarry aggregates, reducing emission in the transport of aggregates).

It follows therefore, to be of great benefit to find an additive, which is not rated as a dangerous substance, which is recognized as being safe for the environment, and ultimately allowing for long-term stabilization of roadways by combining portland cement with in-situ material, hitherto **DURA**MENT, regarded as toxic to GP Portland Cement.

INTRODUCTION - **DURA**MENT POLYMER

Due to growing industrialization in most countries of the world and the desire for mobility of human beings, street and road construction is growing in importance. The most desired road construction material is bitumen. Bitumen has the advantage of being flexible enough to adapt to the movement of the subsoil. Therefore roads, which contain bitumen, do not form any cracks and/or edge projections. Furthermore, a bitumen layer has proven to be exceptionally resistant to abrasion enabling streets with a bitumen layer to last for a long time. The disadvantage of bitumen is its very high price and its lack of availability in many countries.

Additionally, bitumen is not suitable as a construction material for road construction purposes in many countries of the south and far eastern hemisphere, due to the fact that it lacks resistance to heat.

"Our construction staff is familiar with the method of adding the product to the water truck and was happy with the new more concentrated product, which they found easier to work with.

They have no problems incorporating the product and getting the moisture content of the stabilized material correct."

Conventional road construction depends on quarrying non-renewable resources; the process of stabilization has developed primarily in areas where these resources are difficult to obtain. Little, if any, recognition was given to the preservation of these resources particularly where they appear to be readily available. It is surely the responsibility of engineers and designers involved in all forms of construction, and specifically in road construction, to give due consideration to the preservation of these valuable non- renewable resources for future generations.

DURAMENT a liquid-dispersion, has proven to be a solution aimed to reduce resource consumption and reduce greenhouse gas emissions in the road building industry.

DURAMENT has proven to significantly improve the workability of the cement stabilization process in a variety of road sub-grade, pavement upgrade and rail and embankment construction projects (including heavy haul roads, highways, rural roads, pathway construction, hardstands and rail earthworks capping) and will improve the flexibility of standard cement stabilized pavements.

These characteristics can reduce the likelihood of any cement-stabilized pavement cracking caused by the shrinkage of the cement/earthworks/road base on compaction and can provide improved permeability characteristics.

DURAMENT usual application is as a mixture with water, fresh or salt, in specific proportions which is then applied to and mixed with cement-based aggregates or in-situ material, thru to fine sands and high plasticity clays.

USAGE & **BENEFITS**

Uses for **DURA**MENT

The use of non-toxic **DURA**MENT, under geo-technically controlled conditions, enables the road or pavement designer and contractor consideration of a number of construction options when deciding what materials are available and a cost effective method of sub-grade enhancement and/or pavement rehabilitation.

- Stabilization with **DURA**MENT and cement will improve equivalent sub-grade **CBR** to a level where, even in the most difficult instances, can be used as the road sub-base reducing significantly the pavement material supply as well as transport time and associated costs.
- Stabilization with **DURA**MENT and cement will reduce the Plasticity Index (PI) of the sub-grade expansive clays and similar soils whereby a lesser pavement depth could be achieved for the same traffic usage (reducing pavement material supply and transport costs).
- The use of **DURA**MENT in sub-grade cement stabilization reduces the potential of the formation of a rigid sub-grade and block cracking, to a more flexible sub-grade base with increased tensile strength without any significant loss of strength.
- Due to the occurrence of the exothermic reaction, a limited construction period is available for sub-grade mixing and rolling to achieve the required compaction necessitating construction planning to achieve manpower time and equipment usage savings.

road sub grades

pavement up-grades

rail embankment / airstrip

mine hauling roads

Formulate Solutions

DURAMENT engineers review geotech's to custom formulate solutions for each project to ensure maximum CBR and tensile strength for differing in-situ soil or sub-base materials.

DURAMENT's ability to dramatically increase both load bearing and flexibility of a road in almost any soil condition via a exothermic chemical reaction unique to **DURA**MENT's reaction with general purpose Portland cement makes DURAMENT a stand alone product among all stabilizing products in the market today.
DURAMENT has been designed to achieve a high quality result in the base, sub-base or capping layers in a wide range of soil types, including clay, silt, sand, gravel materials and recycled road product.

Polymerized-concrete Slab

A **DURA**MENT road surface operates to prevent dust, corrugation, pot holes, rutting, and other surface degradation issues caused by both heavy traffic and extreme weather. Our advanced technology is revolutionary as **DURA**MENT is designed to be applied with general purpose Portland cement and incorporated into clay, silt, sand, gravel, and re-cycled road materials. Obviously soil type's differ from region to region throughout the world, however upon careful analysis of the geotechnical documents by our engineers on a project by project basis, a customized formula of **DURA**MENT-to-cement assures success every time.

Tried, Tested and True

DURAMENT is "tried, tested and true" in the field by a premier engineering firm and in the worlds foremost laboratories, **DURA**MENT is qualified to make the statement the we are the best road stabilization product the world has to offer. Boasting a "one product fits all" is a bold statement that we embrace whole-heartedly, from sustainability of quarry aggregates and reduction of greenhouse emissions to dramatically increasing CBR and UTS ratings for haulage roads, tarmacs, hardstand areas all with water repellent, dust reduction, and soil stabilization qualities. **DURA**MENT is non-toxic to the environment with no hazchem codes, and is inert to the environment once cured, does not leach toxins into surrounding environment, and can withstand extreme hot or cold temperatures. Safe to use and non-hazardous.

Saving Cost of Quarry Aggregates

Depending on building specifications, **DURA**MENT eliminates the need of trucking in quarried road base material – saving the cost of quarry aggregates, transport and time thus reducing the carbon foot print for each project.

DURAMENT has the unique ability to be used with the in-situ materials, including sand, high/low plasticity clay, and even recycled road material on the spot. The result is a long lasting, waterproof stabilized road base or road surface.

Numerous field tests, completed projects, and Independent laboratory tests have shown that with **DURA**MENT both the California Bearing Ratio and Ultimate Tensile Strength increases. With **DURA**MENT you can confidently say that you're going green while reducing build and maintenance costs.

DURAMENT can extend the build season by a month on either side of the season due to the heat creating exothermic reaction created with the general purpose cement.

Safer Roads

Stabilization of existing gravel roads with **DURA**MENT makes for safer and more efficient travel. Improving the mobility of people and the transportation of goods is greatly enhanced when gravel is converted into a **DURA**MENT Road. Eliminating cracking and pot holing in most conditions further makes for a safer roads and reduces maintenance costs by 70% to 85%.

Traditional road building equipment is required to install a **DURAMENT** road and no capital expenditure outside traditional machinery is required. If your company build roads now – you can build a **DURA**MENT road today.

SUSTAINING **INNOVATION**

DURAMENT, a Sustaining Innovation

As sustainability increasingly becomes a concern to society, it is in all of our best interests to adapt and adopt initiatives that will better serve private and public interests equally and equitably. History has proven time and time again, that come innovation come resistance. Resistance, often motivated by self preservation by those who see themselves with the most to loose.

DURAMENT has occasioned the label of "disruptive technology", being considered an innovation that creates a new market and value network eventually disrupting the existing market/value network and displacing an earlier technology. And at first glance, it certainly may look to be just that.

In contrast to disruptive innovation is a "sustaining innovation," defined as not creating new markets or value networks but rather only evolves existing ones with better value, allowing the road building industry to compete against each other's sustaining improvements.

It is the former which we at **DURA**MENT propose we find ourselves. While it is true that **DURA**MENT has already begun to revolutionize the road building industry, it is equally true that its use has not displaced one road building company over another.

This is due in part to the fact the application of **DURA**MENT requires no new road building equipment in its application, that is to say that traditional equipment already in use can be re-tasked in the construction of a Durament road.

Willingness to adapt and use the new technology that **DURA**MENT represents is influenced by a number of economic factors not so apparent on the surface, however, with a little investigation can be easily seen.

In the implementation of **DURA**MENT, any road building company whose season comes to an end due to winter temperatures can now extend their build season by a month on either side. **DURA**MENT forms its own environment in an exothermic (heat) chemical reactions, thus **DURA**MENT can be applied at freezing temperatures and in rain events. **DURA**MENT can effectively increase the ‘road building season' 3-5 weeks on either side, which renders road contractors more cost effective and competitive. Because **DURA**MENT results in an inert slab; it is not affected by temperature ranges from 60 above to 60 below zero. Thus **DURA**MENT is not affected by thermal expansion and contraction during freeze/thaw cycles.

This factor alone represents a significant opportunity for profits with NO extra capital expenditure.Before **DURA**MENT, industry was bound to the importation of costly non renewable quarry aggregates from greater and greater distances at an ever increasing economic and environmental cost. **DURA**MENT's unique ability to stabilize in-situ earth material or recycled road product gives builders the opportunity to offer solutions to private owners and government which not only reduces their capital outlay for road construction significantly, but also reduces the environmental impact.

DURAMENT cures to a strong solid inert polymer that is impervious to the penetration of water molecules from rain, flooding and/or capillary action. As such there is reduction of maintenance cost by as much as 70%. Road-maintenance companies will enjoy those liberated expense dollars now being applied against the ever increasing thirst for more and better new and reliable infrastructure. More new infrastructure means the road building machine keeps on rolling without disruption.

Finally, with the use of **DURA**MENT, the road building industry while billing out less money per kilometre lane due to the cost saving associated, will make up in part the difference in more kilometres laid per day.
DURAMENT's adaptability becomes more obvious in its ability to be used with a wide range of soils, clays and gravel types, and across a wide climatic range.

CONTACT **US**

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