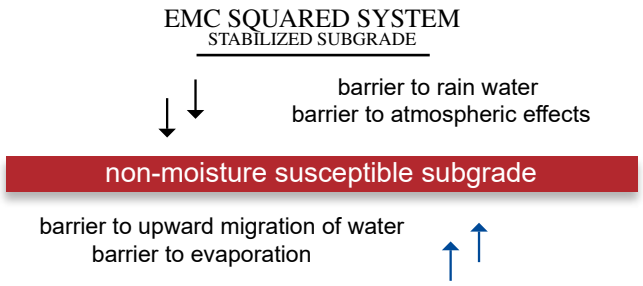
Convergence of Advances in Design, Test Methods and Stabilization Product Technologies

Product Technology

The EMC SQUARED System (EMC2) — Advanced Stabilization Product Technology. Clean. Green. Concentrated power to improve the stability of earth materials at low cost. Applied as compaction water additives to aggregates, soils and recycled pavement materials with pre-established compaction controls and construction procedures, preconditioning aggregate materials to behave more like conglomerate rock, clays like claystone, sands like sandstone, and silts like siltstone, paralleling the natural processes of consolidation and lithification. These stabilizer products have been in use for over three decades for construction of city streets and expressways, county roads, interstate freeways, industrial and renewable energy sites, military supply routes and runways, remote unpaved highways, border roads, haul roads, forest roads, oilfield access roads, temporary and permanent closures of construction sites and landfills, and for other applications.

When cement and lime are utilized for soil stabilization treatment, they typically create rigid soil layers that give strength without necessarily reducing moisture flow through the layer. Cracking is an unavoidable side effect of cement and lime treatment. This reduces their overall effectiveness and often subjects pavements above to reflective cracking generated by the cracking in the cement and lime treated layer below. EMC SQUARED System treatments, on the other hand, typically create layers with improved flexural stiffness and retained elasticity. Equally important, the EMC SQUARED System stabilization treatments reduce the rate of moisture flow through the layer, shedding water off the surface and impeding the upward capillary flow of moisture from groundwater sources below. This ability to function in this manner as a moisture barrier is a revolutionary and fundamental advance in stabilization technology. The stabilized layer itself is not only stiffened, but it also impacts the stability of native soils below the constructed layers by promoting a more consistent and stable moisture distribution. As evidenced in the annual IRI testing of freeway projects, this ability of EMC SQUARED System treatments to beneficially influence stability at a deeper level is resulting in smoother running roads and highways with extended service life. This is the multiplier effect, the exponential power of the EMC SQUARED System (EMC^2) Stabilizer Technology. It promotes greater stability in soils below as well as within the stabilized layers.



The Convergence

With the development of more advanced laboratory test methods and the advancements of Mechanistic-Empirical Pavement Design, the economic and performance advantages of the EMC SQUARED System product technology can be demonstrated in laboratory evaluation, employed in pavement designs and field performance validated with nondestructive testing.

How to Use the EMC SQUARED System Stabilizer Products

Visit http://stabilizationproducts.net. Next, review the case histories and the materials laboratory and field testing reports and request a copy of the EMC SQUARED System Construction Handbook and General Information publication via info@stabilizationproducts.net or by calling 800.523.9992, or 209.383.3296. If you are then ready to take the second step, communicate by email or phone the project specific information that you have available and ask for a price quotation so that you can better understand the

Stabilization Products LLC
Ph: (209) 383-3296 or (800) 523-9992
E-mail: info@stabilizationproducts.net
Website: http://www.stabilizationproducts.net

Canadian Sales
Milieu Road Technologies
(780) 875-9159

economic advantages over conventional stabilizer products, or the potential savings from replacing expensive crushed aggregate base course materials with an economical stabilized soil layer of equivalent stiffness (modulus). Request that you be supplied with a sample format of an EMC SQUARED® System Construction Specification for your specific project requirements. A more in-depth discussion with Stabilization Products LLC staff is also recommended to further review your expectations and the potential suitability of the stabilizer products for your unique project requirements. If the decision is made to move forward and order stabilizer product, then equip your in-house construction crew or contractor with the Construction Handbook and the Construction Specifications and ask that they review and prepare to apply the stabilizer product according to the Manufacturer's Recommendations and per construction specifications. Rigorous construction quality control measures are advised, starting with sampling the material to be stabilized and having the standard laboratory tests conducted such as Sieve Analysis, Atterberg Limits and Proctor compaction tests to determine the Moisture-Density Relations that will govern the construction and the compaction testing program during the stabilization operations.

If an additional engineering basis is desired before moving forward with construction, or engineering test data input is required in order to produce a pavement design defining the pavement structural section before the project can be advanced to the construction stage, then utilize in-house testing services, if available, or contract with a licensed materials testing laboratory that is equipped with the apparatus required to conduct the specific test methods that are recommended. EMC SQUARED System stabilizer products are best evaluated using the more sophisticated test methods that have been evolved during the modern age when testing apparatus are designed and operated by computer-assisted programs capable of modeling dynamic and repetitive loading similar to that which pavements experience under moving wheel loads. The recommended test methods are Resilient Modulus, Repeated Load Triaxial and Dynamic Modulus. These tests are appropriate for evaluating materials for flexible pavement designs and for applications of EMC SQUARED System products that produce base course and subgrade layers that are resilient and retain elastic behavior, in contrast to cement and lime treatments that produce rigid layers with unavoidable shrinkage cracking. Stabilization Products LLC will coordinate with your selected materials testing firm to supply stabilizer product and guidelines for laboratory testing, and to answer any questions they may have.

Use of the AASHTO Mechanistic-Empirical Pavement Design Guide (MEPDG), which requires resilient modulus test results for input, is highly advised. First introduced by AASHTO in 2002, with support in its development provided by the Federal Highway Administration (FHWA), this computationally intensive computer-aided design method is far more sophisticated than the design systems that were based upon data from the AASHO Road Test, a field monitoring study conducted in the 1950's when AASHTO was still known as AASHO. Resilient modulus test data input furnishes a far more detailed understanding of the engineering parameters of the materials being considered during the M-E Design process for potential use in a pavement structural section. Stabilized base course, subbase and subgrade layers under the pavement surface course can provide a far more important contribution to the overall stiffness of pavement system when evaluated according to this advanced design methodology. The net effect is that the costly asphalt or concrete surface course pavements can be reduced in section thickness as the result of increasing the modulus of the base, subbase and subgrade layers with economical stabilization treatments. The other cost-saving options that can be reviewed by the design engineer are the complete replacement of aggregate base course materials with stabilized soils of equal or higher modulus, reduction in the layer thickness of the aggregate section by increasing its modulus with stabilization treatment, or recycling asphalt millings and base course materials as a high modulus stabilized base layer during highway reconstruction projects.

A field test pad or road test section may be other options to further confirm the suitability of the stabilizer products for a project specific application. Once again, the Manufacturer's Recommendations in the Construction Handbook should be observed and a designated project Construction Specification followed in order to obtain the full performance benefits of the stabilizer treatment. For test section or full scale construction projects, field testing the stabilized layers postconstruction with Falling Weight Deflectometer equipment should also be considered to validate that the performance of the constructed layers meets or exceeds the modulus values from the laboratory resilient modulus tests that were used as the input for the M-E Pavement Design. The construction cost savings realized from using the EMC SQUARED System stabilizer products in combination with the M-E Pavement Design method typically cover the cost of the preconstruction laboratory testing and postconstruction field testing many times over and lend confidence and confirmation that the pavement structural section design had a solid engineering basis.