

buried treasure

Uncover Value with CPP

Buried Treasure
Results in Road
Improvement
Savings



With a staggering number of roadways requiring repair across the United States, the need for cost-effective pavement improvement techniques remains one of the most pressing issues for roadway engineers and owners alike. In the past, many transportation agencies covered structurally sound concrete pavement with an asphalt overlay to improve the ride and friction or reduce tire pavement noise. With the steady increase in asphalt prices over the years, the mill and overlay option is becoming far too expensive. Diamond ground pavement surfaces often meet and exceed the smoothness, friction and noise characteristics of the best asphalt surface treatments and can be half the cost of an asphalt overlay. Provided that the underlying concrete pavement is still structurally sound, diamond grinding a previously overlaid pavement becomes a cost-effective solution and allows for the recycling of the asphalt millings as a gravel base or to be sold as reclaimed asphalt pavement (RAP) by the ton for a future asphalt project.

» **A GREEN SOLUTION:
SUSTAINABLE AND COST-EFFECTIVE**

The Buried Treasure concept using concrete pavement preservation (CPP) is a sound integration of engineering, economics and the environment. Technology and modern non-destructive testing tools have significantly advanced the amount of information that can be gathered about the underlying concrete pavement. Ground penetrating radar (GPR), the dynamic cone penetrometer and the falling weight deflectometer (FWD) are just a few of the modern testing tools now available. A thorough investigation of the existing pavement system is vital before undertaking this type of project. CPP is a long-term repair solution engineered to last many years that maintains the road's structural ability to carry heavy traffic loads. Stiff competition within the industry and

BENEFITS INCLUDE

LONG LASTING: Caltrans research has shown that the average life of a diamond ground surface in their state is 17 years.

BETTER FOR THE ENVIRONMENT: CPP is a sustainable pavement repair option offering a smaller carbon footprint as compared to an asphalt concrete overlay.

SIMPLE: No need for guide rail, sign or shoulder/slope modifications. CPP can be completed in off-peak hours with short and mobile lane closures.

SUPPORT LOCAL ECONOMY: All products are produced in the USA, with little foreign oil consumed in the process.

AVAILABILITY: Asphalt shortages and resulting price increases are likely to continue. The CPP industry has capacity and a consistent price structure.

EXPEDIENCY: CPP can be advertised, bid, let and completed in a short period of time.

FLEXIBILITY: Portland cement concrete pavement (PCCP) can be rehabbed using CPP up to three times with little loss of structural or load carrying capacity. Further, applying CPP in one lane doesn't require application in an adjacent lane.

COST-EFFECTIVE: CPP often costs less than thin asphalt concrete overlays.

SMOOTH RIDE: CPP with diamond grinding is smooth and it retains this smoothness longer than alternative surfaces on properly constructed concrete pavement.

QUIET: Diamond ground surfaces are typically much quieter than alternative surface textures applied to concrete pavement.

SAFE: CPP with diamond grinding is safe. WisDOT has shown that a diamond ground surface has 42% fewer accidents in dry and wet conditions as compared to a tined pavement surface.

FUEL EFFICIENCY: CPP with diamond grinding saves fuel. Studies have shown that rigid concrete surfaces exert less rolling resistance than flexible surfaces, thereby saving fuel.

PROVEN: CPP has been used by many DOTs for decades, dating back to its first use in California in 1965.



advancements in technology ensure that CPP pricing is typically far less than alternative repair treatments. Additionally, the recycling of materials can prove to be a major cost saver on virtually any project.

Every inch of asphalt generates approximately 0.05 tons of RAP per square yard. Depending on the oil content of the RAP and the proximity to a project location, this equates to real value in these times of ever increasing asphalt prices. Innovative owners and contractors alike can apply this value towards the cost of milling and diamond grinding, saving money and the environment at the same time.

» HOW IT WORKS

Once the asphalt overlay is removed, a variety of CPP options can be used. CPP is a series of engineered techniques developed during the last 60 years to manage the rate of pavement deterioration in concrete streets, highways and airports. It is a non-overlay option used to repair areas of distress in concrete pavement without changing its grade. This preventive procedure restores the pavement to a condition close to or better than original and reduces the need for major and more costly repairs later. CPP addresses the causes of pavement distress, minimizing further deterioration. Available CPP techniques include slab stabilization, full and partial depth repair, dowel bar retrofit, diamond grinding and joint resealing.



After the pavement has been repaired using CPP, the diamond grinding process begins. Diamond grinding is the removal of the thin surface layer of hardened portland cement concrete using closely spaced diamond saw blades. The process results in a smooth, level pavement that has a longitudinal texture with desirable friction and low noise characteristics. This technique addresses faulting at joints and cracks, pavement roughness, loss of friction, unacceptable noise level, and inadequate transverse slope. Diamond grinding will remove the remaining remnants of asphalt and will provide a safe, smooth and quiet final riding surface.

» BASIC TECHNIQUES

- **ASPHALT MILLING:** This entails removal of the pavement surface using a milling machine, which can remove up to 50-mm (2-inch) thickness in a single pass.
- **PAVEMENT BASE AND SUBGRADE REPAIR:** This technique restores support to concrete slabs by filling small voids that develop underneath the concrete slab at joints, cracks or the pavement edge.
- **FULL-DEPTH REPAIRS:** This procedure is a way to fix cracked slabs and joint deterioration by removing at least a portion of the existing slab and replacing it with new concrete.
- **PARTIAL-DEPTH REPAIRS:** This method corrects surface distress and joint/crack deterioration in the upper third of the concrete slab. Placing a partial-depth repair involves removing the deteriorated concrete, cleaning the patch area, placing new concrete and reforming the joint system.
- **DOWEL BAR RETROFIT:** This method consists of cutting slots in the pavement across the joint or crack, cleaning the slots, placing the dowel bars, and backfilling the slots with new concrete. Dowel bars link slabs together at transverse cracks and joints so that the load is evenly distributed across the crack or joint.
- **CROSS-STITCHING LONGITUDINAL CRACKS OR JOINTS:** Cross-stitching repairs low-severity cracks. This method adds reinforcing steel to hold the crack together tightly.
- **DIAMOND GRINDING:** By removing faulting, slab warping, studded tire wear and unevenness resulting from patches, diamond grinding creates a smooth, uniform pavement profile. Diamond grinding reduces road noise by providing a longitudinal texture, which is quieter than transverse textures. The longitudinal texture also enhances macrotexture and skid resistance in polished pavements.
- **JOINT AND CRACK RESEALING:** This technique minimizes the infiltration of surface water and incompressible material into the joint system. Minimizing water entering the joint reduces subgrade softening, slows pumping and erosion of the sub-base fines, and may limit dowel bar corrosion caused by deicing chemicals.

CPP treatments can be used stand-alone or as a coordinated system as conditions warrant.



ABOUT IGGA

The International Grooving & Grinding Association (IGGA) is a non-profit trade association founded in 1972 by a group of dedicated industry professionals committed to the development of the diamond grinding and grooving process for surfaces constructed with Portland cement concrete and asphalt. In 1995, the IGGA joined in affiliation with the American Concrete Pavement Association (ACPA) to form what is now referred to as the Concrete Pavement Preservation Partnership (IGGA/ACPA CP3). The IGGA/ACPA CP3 now serves as the lead industry representative and technical resource in the development and marketing of optimized pavement surfaces, concrete pavement restoration and pavement preservation around the world.