

Diamond grinding restores a level profile to an otherwise strong pavement.



*Top: Diamond grinding under way at runway centerline
 Bottom: Patching, grinding and grooving operations took place around the clock to minimize runway down time.*



Pilots Give “Thumbs Up” to Smooth Runways

Diamond grinding of concrete pavements increases safety, extends pavement longevity, and improves passenger comfort. These benefits are increasingly being recognized for airports as well as highways.

Diamond grinding restores a level profile to an otherwise strong pavement. Potential advantages of diamond grinding for airports are:

- reduced aircraft vibration while on runway, which can cause air frame fatigue and damage sensitive instruments,
- enhanced skid resistance, resulting in better aircraft control and safety,
- improved braking effectiveness due to increased traction,
- better riding comfort for crew and passengers, and
- for military aircraft, reduced “hook-skip” during back-arresting cable operations.

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*A California-style
profilograph recorded
smoothness before and
after grinding.*

**CPR, concrete pavement
restoration is a series of
techniques used to restore
the integrity of the slab
by repairing isolated
areas of distress.**



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The Osan Experience

Diamond grinding was first used to improve airfield pavements in 1956 at Davis Mohan Air Base in Tucson, Arizona. In the subsequent forty-plus years, both military and commercial airports have recognized considerable improvement after runway and taxiway diamond grinding. One case in point is the U. S. Air Force Base at Osan, Korea.

The airfield at Osan AFB consists of only one runway, constructed in the 1950s. The ensuing years have seen a series of repairs, including a concrete overlay, a runway extension, partial replacement, and several extensive patching contracts. By the mid 1980s, the runway surface was very uneven. Although faulting was generally less than 1/2 inch, there were so many bumps that pilots consistently complained about aircraft vibration. Reconnaissance planes in particular were plagued as sensitive surveillance equipment was bounced around during takeoffs and landings.

In 1999, the U. S. Army Corps of Engineers considered several options for a longer-term repair that would reduce runway roughness. Because Osan AFB has only one runway, minimum closure time was a critical priority. Replacing the most heavily damaged portion of the runway – the center 75 feet – was deemed prohibitive, for both the cost and the required downtime. The Corps decided to replace selected panels, diamond grind the center 100 feet of the entire runway, then regroove the pavement and reseal joints and cracks.

Diamond grinding on the 9000 foot long runway was completed by an ACPA contractor member within a forty day runway closure. Before and after grinding, runway roughness was measured using a California profilograph and a profile index value was calculated. Before grinding, the runway profile indices ranged from 14 up to 92 inches per mile. After grinding, every section showed at least a 70% reduction in profile index. This was a remarkable improvement as many sections came in with a profile index less than 7 inches per mile. Perhaps most significantly, the pilots are very pleased with the improved surface, citing increased control during takeoff and landing.

As can be seen, diamond grinding can be used to economically extend runway life and improve the riding quality of structurally sound concrete runways and taxiways around the world. Osan AFB is just one example of this trend.