

Trapezoidal Grooving

Trapezoidal grooving delivers numerous operational and financial benefits to airport owners, such as:

- Increased pavement life expectancy
- Enhanced drainage capacity
- Reduced risk of foreign object debris (FOD)
- Reduced groove closure
- Improved skid resistance and safety in wet weather
- Reduced requirement for rubber removal.

Overview

Trapezoidal grooving is an industry-leading runway grooving solution to reduce pavement maintenance costs and extend the life of runway wearing courses. Trapezoidal grooving differs from standard square cut grooving, with the angled sides providing enhanced drainage capacity, less rubber build-up and a greater resistance to chipping and groove closure.

Proven through its extensive use across Europe, the United States and South-East Asia, trapezoidal grooving provides superior performance to standard grooving and Downer is the only Australian company equipped to deliver this technology.

Downer has an exclusive partnership with Cardinal International Grooving and Grinding to provide trapezoidal grooving services to Australian airports. Working in conjunction with the United States Federal Aviation Administration (FAA), Cardinal International developed a patented method for installing trapezoidal shaped grooves.

Improved skid resistance and less maintenance



Benefits of trapezoidal grooving

Research by the Federal Aviation Administration (FAA) Airport Technology Research and Development Branch has shown that trapezoidal shaped grooves offer several benefits over standard square cut grooves, including:

Enhanced drainage capacity

Trapezoidal grooving is demonstrated to drain water faster from runways than standard square cut grooving. In the event of heavy rainfall, enhanced drainage capacity can significantly reduce aircraft hydroplaning, leading to better stopping capability, improved safety and reduced runway closures.

Reduced tyre wear and rubber build-up

Monitoring of trapezoidal grooving and standard square cut grooving demonstrates that trapezoidal shaped grooves better resist rubber contamination from tyre wear. FAA observations of both trapezoidal and standard groove areas at the Marine Corps Air Facility Quantico (MCAF Quantico), demonstrated there was less rubber build-up on the top edges of trapezoidal shaped grooves than standard grooves after five months.

A trapezoidal groove has an angle of 117°, which is flatter than the 90° angle of a standard groove. Trapezoidal grooving is therefore less likely to shave an aircraft's tyres as it moves along a runway, leading to reduced tyre wear and rubber build-up.

Less rubber contamination in the grooves reduces maintenance costs associated with rubber removal and ultimately increases pavement life expectancy.

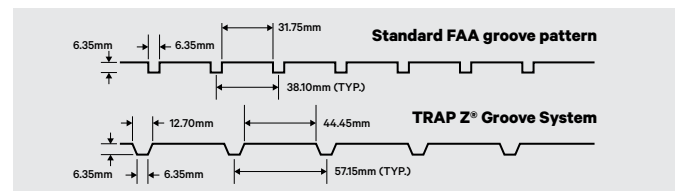
Improved groove integrity

Inspection of trapezoidal grooving demonstrates that that trapezoidal shaped grooves are less susceptible to damage from aircraft and maintenance operations. Close inspection of runway surfaces shows that in several instances, the edges of standard square cut grooves experience chipping and breakage, which can lead to FOD and groove closure. Trapezoidal shaped grooves demonstrate higher levels of integrity and resistance to this type of damage.

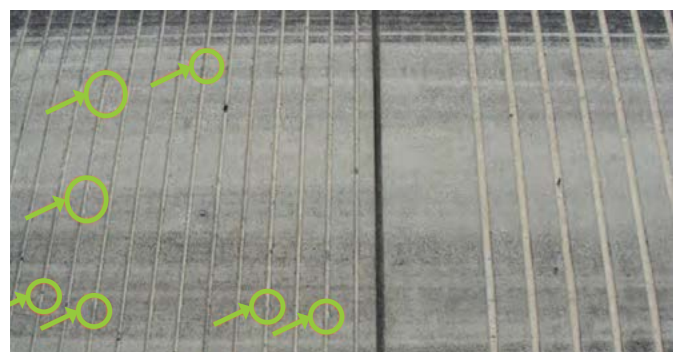
The new Australian benchmark

Ayers Rock (Connellan) Airport was the first Australian airport to embrace this innovative technology and apply trapezoidal grooving to their entire runway. The 2.6-kilometre runway received a strengthening asphalt overlay in 2019, as part of the airport's first major upgrade since 1996. This provided the opportunity to set the new benchmark in runway grooving in Australia.

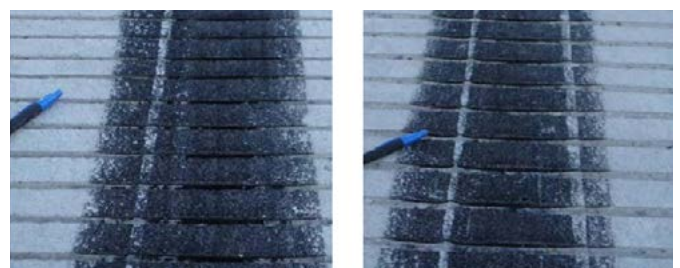
Australian airports are now beginning to specify trapezoidal grooving as standard practice. Trapezoidal grooving has since been applied at Alice Springs Airport, Sunshine Coast Airport and Sydney Airport Main Runway. Downer is currently the only Australian company equipped to deliver this superior technology.



Comparison of standard and trapezoidal grooving profiles



Evidence of damage to edges of standard (left) and trapezoidal shaped (right) grooves



Rubber contamination on standard (left) and trapezoidal shaped (right) grooves. There is an increased rubber build-up on the leading edge of the standard groove section