



SURTREAT®

BOEING

CASE STUDY

PROBLEM

Inhibiting formation of FOD
concrete fragments

STRUCTURE

BOEING C-17 Assembly
Ramp

PROBLEM

The concrete assembly ramps are 13 inches thick. Random fine cracks have developed as a result of the loading and unloading of C-17 aircraft taxiing across them over time. The cracks have enlarged, and additional small cracks have propagated from them. These cracks lead to the formation of concrete fragments, foreign object debris (FOD), which can become airborne and have the potential of being sucked into jet engines causing damage.

Boeing has investigated various methods including epoxy injection for stabilizing the concrete surface to prevent fragmentation and FOD. Surtreat West, LLC was invited to conduct a demonstration of the Surtreat® concrete protection and restoration process on a 750 sq. ft. section of the ramp August 17, 2001.

ABOVE: Assembly Ramp
17, test area before
SURTREAT application.



SOLUTIONS

The Surtreat® process involves the surface application of water soluble chemical formulations, which penetrate the surface to a minimum depth of 2 inches, and react with the cement phase to increase strength, decrease porosity, and inhibit rebar corrosion and cement chemical degradation.

OUR PROCESS

Surtreat West, LLC. applied 7.5 gallons of SURTREAT - GPHP (TPS II) to 750 sq. ft. of taxiway surface on August 17, 2001. Multiple applications of SURTREAT -GPHP (TPS II) were made. Concrete compressive strength was measured before and after applications of SURTREAT - GPHP (TPS II) in accordance with ASTM Testing Procedure C900-01. The after application measurements were taken 84 days later on November 10th, 2001.



LEFT: Surtreat surface applied application.

BELOW: Surtreat penetrating the concrete and binding chemically.



LEFT: Surtreat treated surface acquires a slightly darker, shiny appearance.



TESTING

Concrete strength is determined by measuring the force in kilo Newton's (kN) required to pull a 2 x 1 inch plug from the concrete surface. This force is also expressed in the more conventional psi compression strength scale.

The increase in overall strength is very significant in percentage terms, and demonstrates how Surtreat - GPHP (TPS II) can increase the surface strength of concrete. It is anticipated that the increase may be even greater in areas along the crack faces, which have become weak and are prime sources of fragments and FOD. Surtreat inhibits the formation of FOD by increasing concrete strength.

CONDITION	PULL OUT STRENGTH (KN)	RELATIVE COMPRESSION STRENGTH – PSI
BEFORE APPLICATION	31	4,842
AFTER APPLICATION	49	7,875
CHANGE	18	3,033
PERCENT CHANGE	58% INCREASE	63% INCREASE



ABOVE: Before application of Surtreat extraction plug crumbles easily.



ABOVE: Proximity of the "before and after" test areas.



ABOVE: After application plug doesn't crumble, showing improvement.

We invite your comments, questions, and inquiries. Reach us at one of the below.