

| CASE STUDY |

Pentra[®]-Cure (MH)

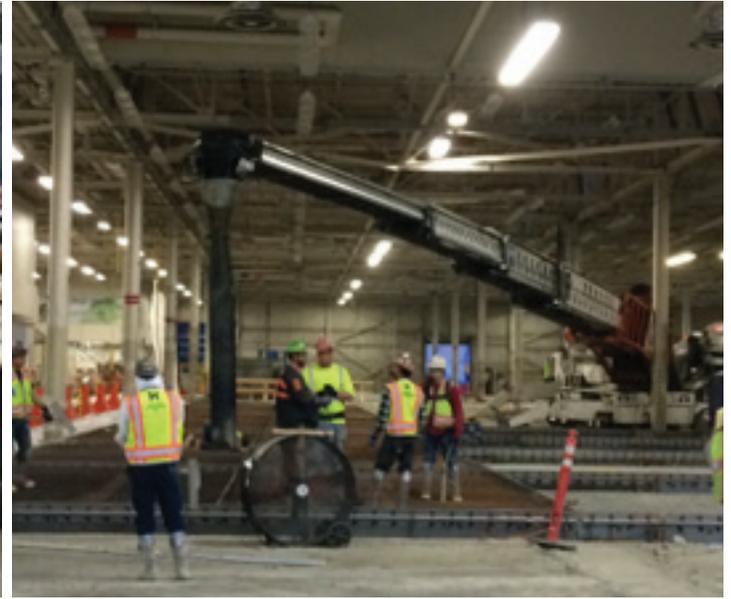


BOEING HANGAR

Location: Everett, Washington

Job Size: 1.5 million ft²

Application: Sprayed on



THE CHALLENGE

Boeing uses heavy pieces of equipment that rotate on the floor so different parts of a plane can be worked on individually – the wings, the tail, the fuselage, etc. This creates an incredible amount of point-load pressure on the floor.

The Everett, Washington Campus, which was being built specifically to support the new 777X Airliner program, would include over 1.5 million square feet of concrete slabs. Two buildings on the campus in particular, the Composite Wing Manufacturing Building and the Automated Fuselage assembly building, were expected to experience extraordinary wear and load on the concrete slab floors. Both buildings use AGV's (automated ground vehicles) working in precise patterns, exerting 1200 psi or more of pressure for thousands of repetitions daily.

Boeing was concerned about damage to the concrete flooring, especially after seeing joints unravelling at other heavy industry facilities in Japan and slab delamination occurring at the Boeing assembly plant in South Carolina.

A critical requirement in this hangar construction was providing an extra durable floor to withstand repeated, heavy equipment usage.



THE SOLUTION

A number of slab durability improvements were recommended, including development of an armored joint system to eliminate the fragile edges at the control joints and to control cracking, which would create other weak areas.

The architect and engineers endorsed different surface treatment combinations, so several mock-up slabs were tested with various products and combinations. CONVERGENT's Pentra-Cure™ (MH) produced the greatest results and was lower in cost than competing products. The densifying components in this formula would fortify the concrete floors and improve wear abrasion and resistance. This one-step densifying and curing product also allowed the contractors to do the job themselves without hiring a middleman, saving them further security clearance inconvenience, as well as labor time and costs.



FINAL RESULTS

Boeing was so pleased with the results they saw from using Pentra-Cure™ (MH) that they also renovated a separate building used for wing assembly on the Everett campus and replaced that existing slab with CONVERGENT's Pentra-Cure™ (MH). The entire project is now complete and in operation, and Boeing has adopted this slab design and product as their standard.

Pentra-Cure (MH) was chosen for three main reasons:

- **BUDGET** ~ The pricing was the best value.
- **PERFORMANCE** ~ Testing showed high abrasion resistance and durable, long-lasting concrete even after destructive testing forces were applied, out-performing all other products used in the test.
- **APPLICATION EFFICIENCY**~ Curing and densifying could be completed in a single step with this product.



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