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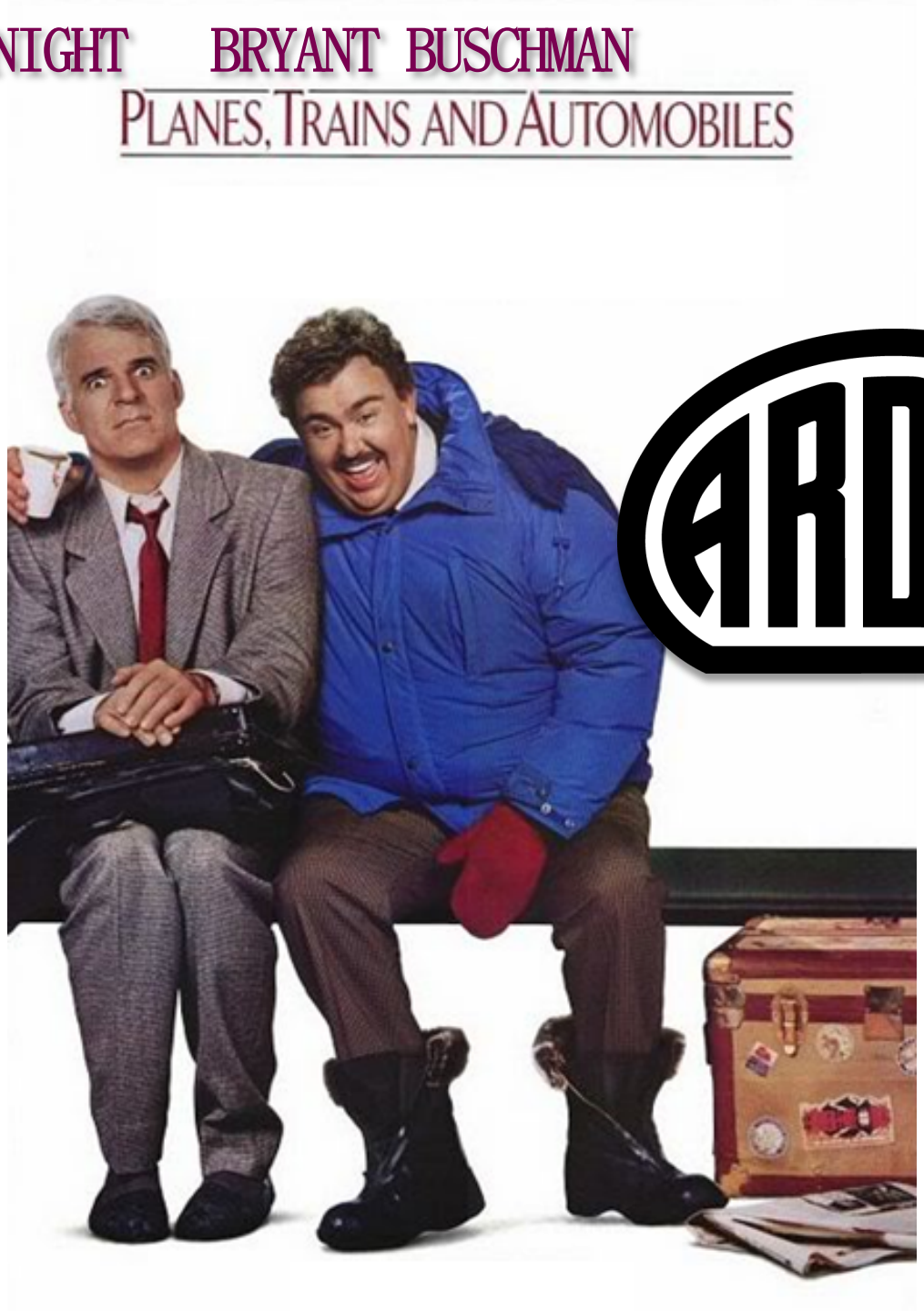

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TRANSPORTATION STRUCTURES

In this presentation, we will look at three concrete repairs that were made on structures used in the transportation industry

- **Eielson Air Force Base, Fairbanks Alaska**
- **Executive Airport, Leesburg, Virginia**
- **Miami Intermodal Center, Miami, Florida**

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TRANSPORTATION STRUCTURES

In each case, we will provide:

- **background information on the structure**
- **identify the problem to be corrected**
- **propose a solution**
- **follow the installation procedures used**
- **provide the results of the repair**

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TRANSPORTATION STRUCTURES

While it would appear that we focused all of our attention on airfields, the work done at these locations was not on any runways, but actually on:

- **a military warehouse for vehicle storage**
- **a hangar for executive aircraft as part of a terminal expansion**
- **the car wash area of a newly constructed rental car facility.**

TRANSPORTATION STRUCTURES

Products used in these repairs included:

- **two different types of priming systems**
- **an unmodified and a polymer modified concrete repair mortar based on OPC**
- **a silica fume modified type III mortar**
- **a self-leveling concrete topping**
- **surface dressing to aesthetically blend the repairs into the surrounding concrete.**

Mobility Storage Warehouse
USAF Fighter Wing, Eielson Air Force Base, Fairbanks, Alaska

Eielson Air Force Base

Background: 26 miles southeast of Fairbanks, AK

Established as Mile 26 Field 12/15/1943

Renamed Eielson Air Force Base, 13 January 1948

Home of the 354th Fighter Wing

MOBILITY STORAGE WAREHOUSE

Background - This facility is used for a variety of purposes from storing parts to very large heavy-weight vehicles.

PROBLEM

The United States Air Force needed to restore the concrete wear surface in several Mobility Storage Warehouses at Eielson Air Force Base in Fairbanks Alaska.

This required a surface that could withstand the various wheel types and weights and a variety of activities.

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PROPOSED SOLUTION

In order to accommodate all of the different types of traffic and get the flatness they needed, a self-leveling, high compressive strength concrete topping (6000 psi) with a chemical and abrasion resistant epoxy coating as the wear surface was recommended.

SHOW ME FIRST!

- **Contractor was awarded a trial installation of one Mobility Storage Warehouse with a total of 12,000 sq. ft. of surface.**

- **If the USAF command was satisfied with the finished result they had an additional 200,000 sq. ft. of warehouse space that needed new wear surfaces.**

INSTALLATION

- The existing surface of the warehouse floor was shot blasted to achieve the required CSP 3 Profile.
- A high strength low viscosity epoxy primer was rolled onto the prepared surface at a thickness of about 10 mils.
- Fine sand (sieve size #30) was then broadcast to refusal directly into the freshly applied epoxy.

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INSTALLATION

The epoxy was allowed to cure overnight and the excess sand was then removed.

The self-leveling topping was pumped at an average thickness of just under 1/2” directly onto the sand which was totally locked down by the epoxy primer.

The topping set to a walkable hardness in about 2-3 hours.

The entire installation of the self-leveling product took less than 4 hours to do the 12,000 sq. ft. area.

INSTALLATION

After drying, the self-leveling topping was coated with an epoxy coating to provide additional wear and abrasion resistance and to withstand the various fluids that would at some point be spilled or leaked onto the floor to include:

- **Jet fuel**
- **Hydraulic Fluid**
- **Oil**
- **Gasoline**
- **Solvents**

RESULTS

A very flat, smooth self-leveling concrete surface with an epoxy coating that has been performing superbly without any signs of failure under a variety of vehicular traffic.

The additional 200,000 sq. ft. of warehouse space will be awarded later this year to receive the same system of repair once budgets are released.

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Executive Airport Expansion - Leesburg, VA

Executive Airport Expansion

Background: Leesburg Executive Airport was built in 1963 to replace a grass field on the eastern edge of the town that was originally owned by radio and TV personality Arthur Godfrey.

Originally named Godfrey Field (since Godfrey funded the majority of the airport) it is now known as Leesburg Executive Airport at Godfrey Field.

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Executive Airport Expansion

The Leesburg Executive Airport was constructed in 1964, and since that time has grown to be the second busiest general aviation airport in Virginia.

Because the construction of aircraft parking spaces at the airport failed to keep up with the growth in number of based aircraft, it was necessary to expand these facilities.

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PROBLEM

The newly poured concrete experienced some topical fracturing, which is not uncommon for air-entrained concrete with a steel trowel finish.

Upon walking the jobsite it was observed that there were areas of surface cracking ranging from 1/4”-1/2” deep. The cracking that occurred was on a broad scale.

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PROPOSED SOLUTION

Two alternative systems were recommended to solve the problem.

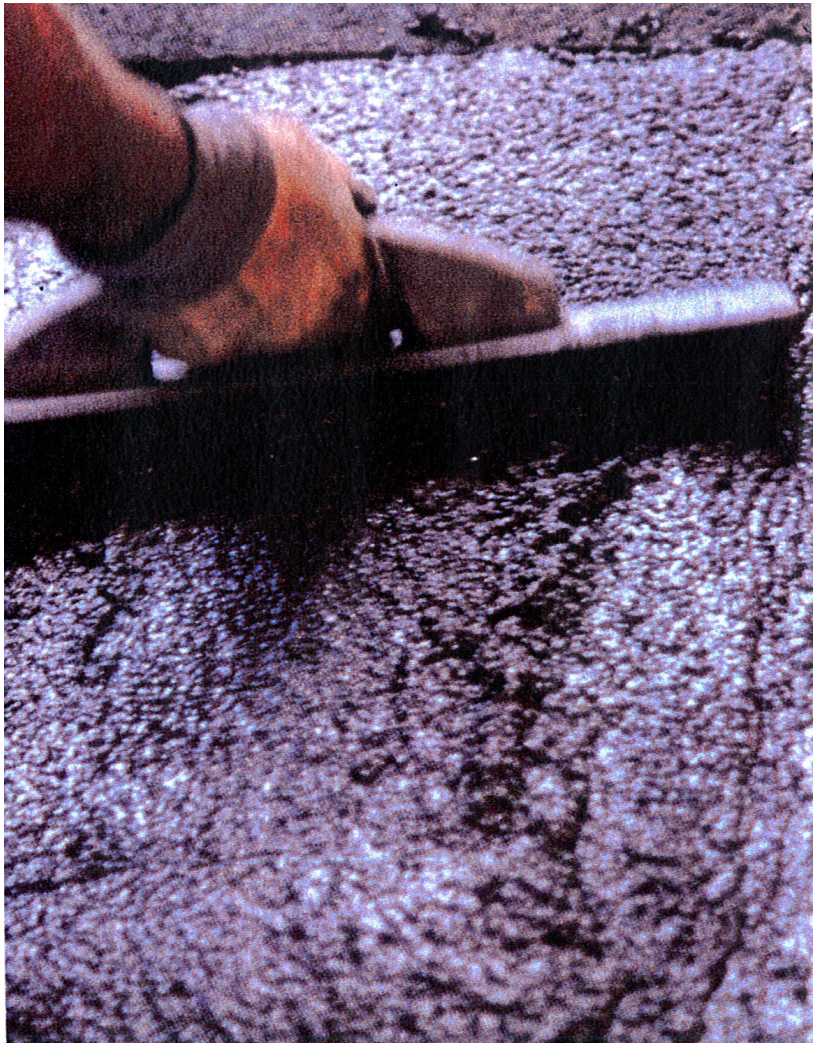
1. **Application of an exterior grade repair mortar using a two component bonding agent followed by a concrete surface dressing.**

2. **Application of an epoxy primer followed by the installation of an exterior grade concrete topping**

INSTALLATION

The general contractor chose the trowel grade mortar option. He liked the idea of cutting out and repairing areas and then re-dressing the surface better than having to float the entire slab with self-leveling concrete.

In addition his labor force was more familiar with trowel grade materials than they were with self-leveling.



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INSTALLATION

The substrate was prepared to remove all disbonded surfaces.

The area was primed with a two component bonding agent and the mortar placed into it within the hour.

RESULT

All of the topical delamination had been repaired and the entire surface was given a brand new surface finish.

The contractor was impressed by what had looked to be a concrete disaster, turning out perfectly.

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MIC BUILDING - MIAMI, FL

MIC BUILDING - MIAMI, FL

Background: This concrete structure is a key logistical solution to the traffic at the Miami International Airport. Will decongest MIA's curbside congestion by 30 percent.

The building will house all the major car rental agencies under one roof. It will also be used as a taxi stand, train station, metro rail station and have a tram system to and from the airport.

The MIC Building is designed to eliminate the need for shuttle busses and to significantly reduce traffic inside the airport.

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MIC BUILDING - MIAMI, FL

4 levels - each 20 acres in size - first 3 floors for storage and maintenance operations – 4th level to accommodate spacious customer service lobby

Second largest facility of its kind in U.S. - 6,500 total car capacity allocation for up to 16 rental car companies

3.4 million square feet

Ready/Return car area - Fleet Storage/Staging area

Quick Turnaround Area (QTA) for washing and refueling cars

- **120 fuel positions**
- **42 wash bays**
- **180,000 gallons of fuel on site**

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MIC BUILDING - MIAMI, FL

During the construction of this structure over a two year period, we worked with the various construction companies to recommend several different horizontal and vertical repair materials for patching, smoothing and finishing a multitude of concrete surfaces both inside and outside of the structure.

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PROBLEM

As the MIC Building neared completion, it was discovered that there was insufficient slope to the entrance of the car washes. The waste water was not going into the collection drains properly for recycling.

The architects and engineers designed a water containment ramp that would correct the slope and redirect the water back to the drains. The challenge was to find and install a product that could be placed from 1/2” to 3” neat in an environment exposed to constant cleaning water.

FUELING STATIONS AND CAR WASH

PROPOSED SOLUTION

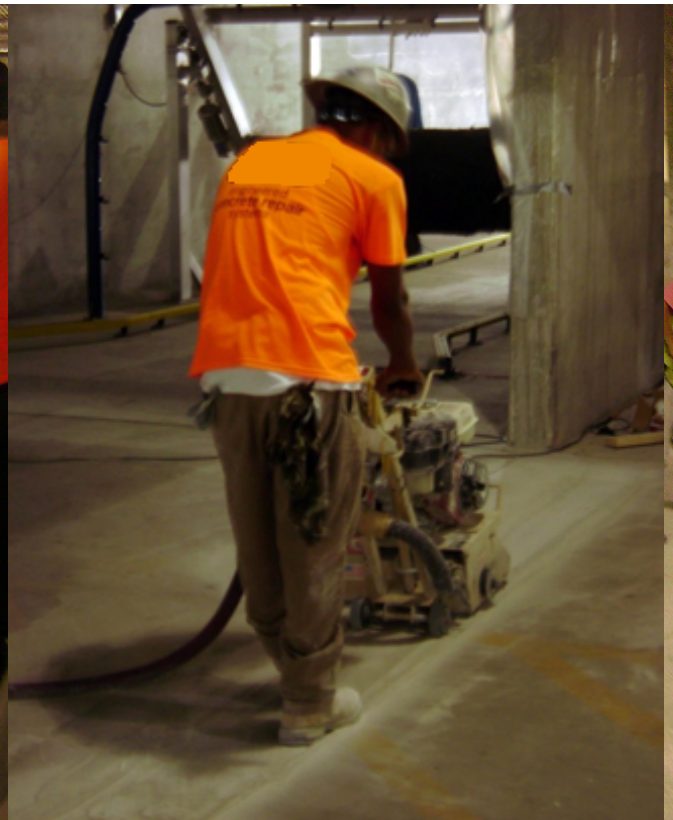
We recommended to the concrete contractor to install a test area of a fast-setting, high strength, microsilica-modifed repair mortar over an epoxy priming system.

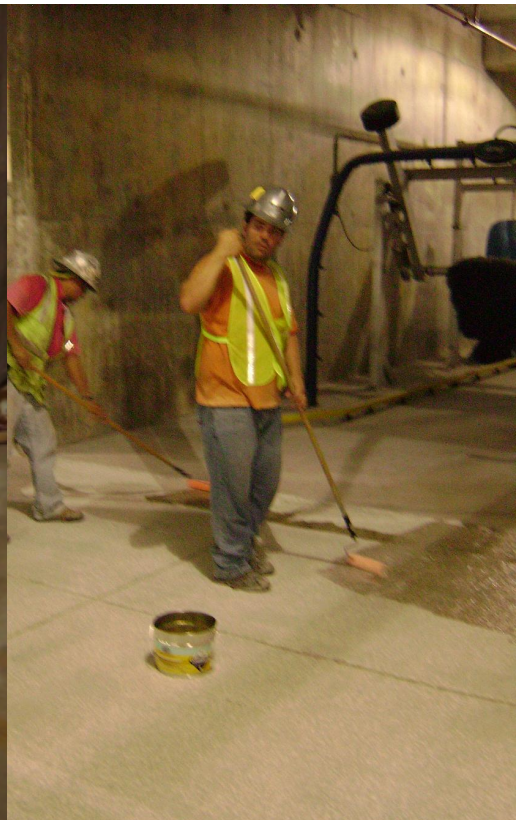
The mock-up test area needed to result in a permanent, functional and aesthetically pleasing surface that would receive approval from over forty people, including all the tenants, the various A&E professionals and the job management team.

INSTALLATION

A test area of some 200 sq. ft. area was scarified to ensure a sound, solid concrete surface had been achieved.

Once scarified, the surface was coated with 10 mils of a substrate preparation epoxy into which fine sand, sieve #35 was broadcast.





After the epoxy had cured overnight, the excess sand was removed and the repair mortar mixed and floated into the forms that had been built to achieve the specified slope to drain.

INSTALLATION

After the mortar had dried, the surface was finished with a fine concrete surface dressing to blend the repair into the rest of the concrete.

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RESULTS

- To check that the installation was sound, a sledge hammer was taken to the cured system only three days after the installation.
- The architects then drove over the ramp and asked the general contractor to drive on the ramps daily for one month.
- After all that abuse, the water containment ramps proved indestructible and approval was given to proceed with the building of the other 42 ramps, one per car wash, along with a helix ramp and several walkways around the complex.


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