

# Airport-In-The-Sky

*Rebuilding a Piece of History*

*By Rob Davis, Ph.D. & Gordon Rayner*

California Pavement Maintenance Co. (CPM) first looked at the Santa Catalina Island "Airport-in-the-Sky," in September of 1997. The Santa Catalina airport is owned and operated by the Santa Catalina Island Conservancy. Members of the Wrigley family established the Santa Catalina Island Conservancy in 1972 as a non-profit organization dedicated to the preservation of the natural resources of Santa Catalina Island. In 1975, Mrs. Philip K. Wrigley and Mrs. Dorothy Wrigley Offield deeded 42,135 acres of the island to the Santa Catalina Conservancy and since this time the Conservancy been responsible for the interior roads and beaches and operates the popular recreational Airport-in-the-Sky as part of its commitment to providing public access to the islands.

CPM was asked to evaluate and provide alternative maintenance solutions for the airport's runway, taxiway and airplane parking areas by Conservancy Engineering Consultant Tom Smith. The airport is located in the center of the island, at 1,602 feet elevation. Its single 3,250-foot runway is able to accommodate small planes \_ up to and including the size of a DC3. From the air, Catalina is a 21-mile long ridge of mountains, extending from northwest to southeast, varying half a mile to eight miles wide. The Airport-in-the-Sky was completed in 1946 by blasting away the tops of two mountains and using the 200,000 truckloads of rock to fill the gap between the mountains. Prior to the construction of the airport, the island was accessible only by amphibious aircraft. Construction and maintenance of the airport's pavement surfaces has always presented unique challenges and this project was to be no different. There are no rock crushing facilities on the island. There also is no asphalt plant for hot-mix nor emulsion source for pavement treatment materials. All materials have to be transported to the island by barge, then hauled to the airport. CPM Project manager Rob Davis related, "My boss, CPM President Gordon Rayner, delicately reminded me of the need for planning when your supply line ends at a pier with a barge that runs once a week."

CPM has prior experience with long supply lines and has constructed or assisted RoadSaver customers with projects in many parts of the world. Although not an island, a previous project in Punta Arenas, Chile on the Straights of Magellan required

the equipment and materials to be barged over 1,500 miles due to impassible glaciers on the mainland. Most of CPM's work is in the western states where they maintain offices in Sacramento, Fontana, San Diego, and Las Vegas.

Barge deliveries arrive at a staging area near picturesque Avalon, Catalina's center of population and world-renown beach resort town noted for its climate, ocean sports and friendly atmosphere. The airport is ten road miles from the barge landing area and is connected by Summit Road, which follows a ridge that climbs from sea level to the airport, at over 1,600 feet in elevation. Portions of Summit Road date back to the original stage road built around 1887 to take tourists to exotic sounding places such as Emerald Bay, Little Harbor and Eagle's Nest. Today it remains a narrow mountain road that in some places is no wider than 17 feet, and is comprised of steep grades with multiple switch backs, hairpin turns and cliffs falling hundreds of feet into canyons and valleys. Traffic on this road is restricted and is limited in size to a ten-wheel truck, and then only with caution.

Any proposed repair methods would have to take the "Catalina Factor" into consideration. All supplies and equipment to be brought in by barge, multiple transfer points for loading and unloading equipment and material, and the tedious job of transporting all of this to the airport itself. Definitely not part of the normal bidding process.

The Airport runway, apron and taxiways



surfaces were found to be in varying states of service. The original pavement appeared to be built up layers of oil and screenings (Chip Seal). Over the years the surface had been further treated with a variety of Chip Seal, Slurry Seal and seal coat preparations. The last of these appeared to be about 10 years old with only cold mix patching being done since that time. Time and weather has taken its

toll.

The runway, taxiways and apron were



severely cracked and potholes were abundant along the entire surface. Many of the cracks penetrated through the entire surface to the base and there was extensive shrink cracking throughout the seal coat that had been applied on the apron areas. Proposals and recommendations were made based on the condition of the surface at that time and included options for various alternative treatments. This was before the 1998 El Nino storm system hit with a vengeance. Storm damage not only delayed the start of the project by months, but also did considerable damage to the existing surface. Repair options were re-evaluated several times during this phase to accommodate these changes as well as the new problem of having a water-saturated base. Repairs needed to begin as soon as weather conditions would allow. To make the best use of the available dollars, CPM had to design a system that could be built without the expensive process of hauling an asphalt plant to the island. This meant designing and using asphalt based, cold applied surfacing materials.

CPM's final proposal included:

- Cleaning, preparing and treating the distressed and failed areas with one or more treatments of Chip Seal.
- Placing a polymer-modified Chip Seal on the entire surface once repairs are completed.
- Performing a rut filling, depression leveling and re-profiling operation using a highly modified material produced by RPM equipped RoadSaver Microsurfacing machines.
- Resurface the entire surface with a modified RPM 2 Slurry Surfacing.

CPM was officially awarded the contract for resurfacing the airport in March 1998 with work to begin at the end of May. CPM began extensive planning to mobilize Chip

Seal and Slurry Seal equipment, material, and manpower as well as the coordination for housing the various crews and scheduling the different operations of the project. Santa Catalina is one of the California Channel Islands and is located, as the song goes, "26 Miles Across the Sea" west of Long Beach, California. This meant that all of the equipment, materials and supplies for the airport project would have to be barged from the Port of Long Beach to the City of Avalon. The crews would have to fly in or take the high-speed passenger ferry.

The Chip Seal portion of the work required 700 tons of 5/16 chip aggregate, supplied



by Chandler Aggregate located in Corona, California. All 700 tons of aggregate were transported to the Port of Long Beach by transfer trucks at approximately 25 tons per load. The Chip Seal aggregate was then dumped directly onto the barge and the material was hauled in bulk to the island.

The barge capacity was approximately 400 tons per trip. Therefore, it would require two trips of the barge to complete the transfer of the Chip Seal material to Santa Catalina Island. The first barge left on May 15th with 400 tons of aggregate, and the remainder of the Chip Seal aggregate was barged to the island on May 19th.

Once the Chip Seal aggregate arrived at Santa Catalina Island, it was off-loaded by loaders and ten-wheel dump trucks and placed in a holding area adjacent to the barge facility. From May 16th to May 18th the Chip Seal aggregate was transported to the airport in ten wheel dump trucks. Three trucks were used to complete this transfer carrying approximately ten tons each. It took each truck nearly two and one-half hours to make this 20 mile round trip. Once the Chip Seal aggregate reached the airport, the aggregate was staged along the east apron area. This process was repeated once the second load of Chip Seal aggregate arrived on May 19th.

The Slurry Surfacing aggregate used was a Type II provided by Livingston-Graham Blue Diamond Materials located in Irwindale, California.

The Slurry Surfacing aggregate, like the Chip Seal aggregate, was transported via transfer trucks to the Port of Long Beach and dumped onto a waiting barge. In all, over 600 tons of Slurry aggregate was barged to the island.

The first load of Slurry Surfacing aggregate was barged to the island on May 19th along with the remainder of the Chip Seal aggregate. It was important that the two aggregates were not mixed and precautions were taken to insure that these aggregates were not contaminated. The remainder of the Slurry Surfacing aggregate was barged to Santa Catalina Island on May 22nd and May 29th.

Like the Chip Seal aggregate, the Slurry Seal aggregate was off-loaded in Avalon, stock piled and then tediously transported to the Airport, where it was staged for construction.

CPM asked John Franklin, President of Franklin Construction Inc, to assist in the construction of the chip seal portion of the work. CPM, in addition to being a Slurry and Microsurfacing Contractor, is also a Chip Seal and Asphalt Paving Contractor. When asked why CPM would use another contractor for a portion of work they might normally do, Rob explained, "CPM will often use other quality contractors when it is beneficial to the customer, even if it means giving up a portion of the work we might normally do. In this case we knew that Franklin Construction had a project scheduled about the same time in Santa Monica, just a few miles up from Long Beach. Asking them to participate would save the many thousands of dollars it would cost to mobilize a crew and equipment from Northern California, which is where our crew was at the time. I was very pleased with the performance of John's crew and since I personally spent years with CPM's Chip Crew, both as a crewmember and a supervisor, I know what I am looking at. There was one other factor, both Gordon and John have a history of involvement with flying and airports, in fact, John is the owner and operator of the airport at Paradise, California and uses his T-210 Cessna the way most of us would use a car"

The Chip Seal equipment included a Bearcat chip spreader, two Bearcat distributor trucks with trailers, kick brooms, rubber tired rollers, ten wheel rock trucks, a service truck, pick up trucks and low boy tractor trailer. The Chip Seal equipment was loaded on the barge in Long Beach between 8:00am and 1:00pm and sailed at 3:00pm on May 27th. It took four hours for the barge to transit from the Port of Long Beach to Avalon. The Franklin Chip Seal crew took the Catalina Express boat to Avalon, which took 1 hour and 10 minutes

to make the crossing. The Chip Seal equipment arrived at 7:00pm and was off loaded by the Chip Seal crew. The equipment was assembled and readied for the trip up to the Airport. The convoy of Chip Seal equipment, through the City of Avalon and up the mountain road, began at 8:00pm. The process took several hours, going up through the switchbacks and narrow road to the airport. The broom and roller operators experienced some thrills and were bitter cold by the time they reached the airport. The two boot trucks had to jack knife more than once to negotiate many of the hairpin turns, the trailers were left in Avalon. During construction, the boot trucks would return to Avalon in the evening to pump emulsion from the trailers and return each morning to the airport.

During this mobilization, the Santa Catalina Island Conservancy Ranger met and inspected the equipment for foreign plant and seed matter. Six hundred twenty-five tons of Chip Seal aggregate and 50 tons of Latex-Modified Cationic Rapid-Set (LMCRS) asphalt emulsion along with the Chip Seal equipment and crew was now staged and ready for construction. The crew returned to Avalon for the night. On May 28, the resurfacing operation of the Catalina Island Airport began. The first task was sweeping and cleaning of all the pavement surfaces in preparation for the initial repairs. The runway, apron and



taxiway potholes were patched by crack filling with emulsion and then applying with one or more layers of polymer-modified Chip Seal. The process was labor intensive and required that each hole be hand-sprayed with LMCRS (Latex-Modified Cationic Rapid-Set) emulsion and then treated with chip aggregate. All repairs were rolled with a pneumatic roller. Some areas, such as the edge of the taxiway, were repaired in the conventional manner by spreading the emulsion with the boot trucks and applying the chip aggregate with the chip spreader. In other words, these areas, as well as all the repairs and other weak areas, would ultimately receive a double Chip Seal. Upon completion of the patching and

repair work, the final surface coat of Chip Seal was applied to approximately 420,000 square feet. The final chip seal application began with the placement of Latex-Modified Cationic Rapid-Set asphalt emulsion (LMCRS-2h.) A pair of Bearcat distributor trucks spread the emulsion at the rate of .28 gallon per square yard. This was immediately followed by the application of 18-20 pounds per square yard of medium-fine (5/16) chips, which were set in place by pneumatic tired rollers. The final surface application began at 7:30am on May 29th and was completed at 7:00pm the same evening. Any excess screenings were swept the following day. The Chip Seal equipment, less one broom and a pneumatic roller, was then trans-



ported back to Avalon for the return trip to the Port of Long Beach. Both equipment and chip seal crew returned to Long Beach on Saturday, May 30th. The first member of the Slurry Seal crew arrived on the incoming ferry on that same Saturday morning and commenced post sweeping after the chip seal placement to remove excess aggregate screenings from the runway, taxiway and apron. The sweeping continued Sunday the 31st and was completed Monday June 1st. This allowed the Chip Seal mat to cure for three days prior to Slurry Surfacing patching and profiling operations.

The Slurry Surfacing equipment, two specially-equipped RoadSaver II RPM units, plus a tanker, a flatbed support unit, a crew cab, supervisor's truck and two insulated asphalt emulsion tankers were assembled at the Port of Long Beach on Monday morning, June 1st, for transport to Avalon. Seventy-five tons of Latex-Modified Cationic Quick-Set asphalt emulsion (with 3% Latex by solids) was transferred from transport tankers to the insulated storage trailers at the Port of Long Beach. Additional materials including totes of carbon black and EVA polymers, fibers and cement were also loaded onto the barge with the Slurry Seal equipment. The barge, equipment and materials left Long Beach at 11:30am.

The Slurry Seal crew took the Catalina express boat and met the barge in Avalon. The barge arrived in Avalon at 3:30 PM.

The Conservancy Ranger met the equipment upon arrival in Avalon. The equipment was inspected and given a clean bill of health prior to off-loading. The crew unloaded the equipment and lined it up on the road, a supervisor's pick up with yellow flashing caution lights in the lead. The stake bed and trailer would be last in line because this unit would have the hardest time negotiating the Summit road. This time the convoy to the airport had an escort through town and traffic on the mountain road was stopped. The equipment arrived in the early evening and was prepared for work the next morning. The crew returned to Avalon for the evening. Both the Chip Seal Crew and the Slurry Seal crews stayed in a house rented for the duration of the project. The house provided comfortable sleeping arrangements, a washer and dryer, and a full service kitchen. By this time the crew had heard all about the Buffaloes wandering on the runway and had witnessed the varying climates that Catalina has to offer. Most visitors think of bison and goats when they think of Catalina's animals, but the island has many native animals of equal attractiveness and of great biological interest. The island's isolation and unique environmental conditions give sanctuary to a wide variety of creatures ranging from crickets and walking sticks to Bald eagles and Peregrine Falcons. Although once gone from the island, these magnificent birds were re-introduced to Catalina by a combined effort between the Institute for Wildlife Studies, the Peregrine Fund and the Catalina Conservancy. Catalina offers a tremendous diversity of climates ranging from desert to forests and the marine life around the island is so abundant that even early man appears to have enjoyed this bounty. Carbon dating of artifacts found in the Little Harbor area



have been dated to ancient cultures as much as 6,800 years ago. This and other interesting historical information can be found in a booklet "Santa Catalina Island - The Story Behind the Scenery" published by KC Publication in Las Vegas, Nevada. The Slurry Surfacing operation commenced with the filling of potholes, ruts and corrective profiling using materials

and methods developed by CPM. The patching materials used a combination of LMCQS-1h (Latex-Modified Cationic Quick-Setting) emulsion with 3% Synthetic



Butadiene Rubber co-milled into the asphalt emulsion. In addition, 4% Ethylene Vinyl Acetate was post-injected into the mix through the RoadSaver RPM system. For further strength, a blend of fibers and cement was added to the mix. For deep holes, the aggregate was modified with a larger stone matrix.

This mixture was initially applied to the potholes and uneven surface areas to correct surface irregularities, which were unable to be fully corrected by the chip seal operation. Most of the holes and uneven surface were worked by hand for the first lift and then profiled with a specially constructed spreader box and additional material. Approximately 100,000 square feet of profiling and leveling was completed on June 2nd and 3rd. Some areas required multiple applications of this mixture, and additional fiber and larger aggregate was added to lend strength to the deeper areas. A pneumatic roller was used to compact all patched areas.

The spreader box that was used for pothole filling and profiling was specifically designed by CPM for the Catalina Island Airport project. This spreader box was shorter than a normal 13-foot box and had a special strike off attachment for leveling. The final surface treatment was the application of a modified Slurry Surfacing developed by CPM called RPM 2 Surfacing. The RPM 2 work began on the afternoon of June 3rd and continued through June 4th. RPM Surfacing is made and applied to the existing pavements by a specialized slurry/microsurfacing machine, the Road Saver II. CPM builds these machines in Sacramento and sells them worldwide. Gordon stated "The RoadSaver II was built for performance and reliability. While Catalina may be a remote location in some terms, many of our international customers send their machines into far more isolated areas where reliability is critical. The RoadSaver II is designed for that."

The RPM design used for the finished surface used the same LMCQS-1h as the

base emulsion, a Type II aggregate and a blend of 4% EVA and carbon black. Each RoadSaver II was equipped with separate tanks for additional polymers and the carbon black. These two materials were metered, proportioned and mixed together through an in-line blender prior to being injected into the mixing pugmill of the RoadSaver as part of the computerized electronic sequencing operation which controls the various components.

The mixture was then fed into a spreader box, which spread the RPM Surfacing onto the pavement surface. A RoadSaver spreader box was used for the final RPM Surfacing application. Once the RPM Surfacing had set, it was pneumatically rolled once again.

RPM Surfacing Systems have been under development by California Pavement Maintenance Company since the late 1980's. Using internal testing and development facilities and their own equipment design and fabrication unit, Rayner Equipment Systems, CPM has achieved significant improvements in the search for better Preventative Maintenance Systems.



RPM Surfacing offers flexibility in design to better service the wide variations in pavement needs such as those required for the Catalina Island Airport. Special polymer binders are used to increase the strength of the RPM Surfacing mix and help raise the softening point of the base asphalt blend. Added materials, such as carbon black, assure a dark color and provide protection against oxidation and ultraviolet light. The dark color provides a better background for pavement markings and provides a uniform color over the entire resurfaced area. This is especially useful on airport runways where the color differential helps the visibility in areas of overcast or smog. After opening of the airport, one pilot commented, "I thought I was on the wrong island!"

At the end of each day the equipment was cleaned and prepared for the following day's work. The tanker truck returned to Avalon to pump over emulsion at night and once during the day. This was also a two and one-half hour trip. While the tanker was making this trip, the crew would use

the time to continue working on patching and running out the material that had been loaded on to the trucks prior to the tanker departure.

CPM installed RPM Surfacing on the runway, the taxiway and tie-down areas according to our their contract. When these areas were finished, CPM took stock of the extra materials they had on hand. Extra materials were brought to cover the potential losses in transportation, contamination in handling and unknown factors. Since the seas were calm and the handling was efficiently done, they used these materials to resurface the terminal parking area and the access road leading into the airport.

Resurfacing was completed on June 4th and the equipment was mobilized back to the barge staging area. CPM swept the dirtier parts of the Summit Road on the return to Avalon. This provided some excitement as two large buffaloes decided they wanted to see what was going on and the broom operator was afraid they might have developed a romantic interest in the sweeper.

"Part of the enjoyment of working on a project such as this," commented Rob Davis, "is the diversity from normal construction projects. Besides the challenge of the logistics and the opportunity to show how we can really perform, Catalina Island offers a variety of wildlife such as wild sheep, foxes and buffaloes. Operations were disturbed more than once by the appearance of buffaloes onto the airport. The airport employees and ranger would then come and herd the animals back to a safe area. It was never a dull moment. Long days, hard work, but never dull."

It wasn't all work however, the crew had a great time on the island and enjoyed the beaches, clubs and the scenery of the island. On Wednesday, June 3rd, Project Manager Rob Davis and Construction Supervisor Bill White barbecued steaks and fries for the crew. Rob, an ex-Navy Seal, also got in eight scuba dives, including three shipwreck dives and was seen in the company of seals and sting rays capping off those hard grueling days on Catalina Island.

Barge day came, the equipment was loaded, the crew boarded the passenger ferry and returned to Long Beach on Friday June 5th, leaving behind only footprints, memories, a new airport pavement surface and the keys to one of the pickups left at Long Beach.

When asked what led to the success of this project, Rob Davis replied, "For our part, months of planning, coordination and logistical work by many CPM employees, plus having the right materials, equipment

and know how to do the job. Without the RoadSavers, this project simply wouldn't have turned out so well. These machines have so much flexibility and mixing power that we were able to make all these various blended materials right on the job. For the project as a whole, we had the excellent cooperation and support of the Conservancy, Paul Moritz, the Catalina Airport Manager, Tom Smith of K&H Engineering and John Franklin and his chip crew. I would also have to give special credit to Oden Zanderwiel of Catalina Island Conservancy, whose efforts made it all work."

"Our crew, who worked hard on this project, consisted of Bill White, supervisor; Javier Escobedo, Operator, who put all his 20 years of Slurry experience to the test here; Jose Delara, line driver; Jose Tovar, shuttle; Pablo Hernandez and Javier Reyes, squeegee men and Dave Taylor, roller and kick broom operator and amateur buffalo enthusiast."

Work was completed on schedule and the Catalina Island Airport re-opened June 5, 1998 as planned. While the airport was "officially" closed for nine days during construction, Catalina Airboat Service, who carries freight between Long Beach and Santa Catalina Island, continued to fly their normal schedule. The four planes, including one DC 3, took off and landed on the dirt adjacent to the runway making a minimum of three round trips to Long Beach every day with the exception Saturday and Sunday.

At least 30 flights arrived the first day of operations after resurfacing was completed. Many commented that "This is a great new runway," one pilot said "It was worth the wait" while another said, "You can see this runway for miles."

Now as long as the buffalo don't roam back out on the runway.....



California Pavement  
Maintenance Company, Inc.  
9390 Elder Creek Road  
Sacramento, CA 95829  
(916) 381-8033  
FAX (916) 381-3703  
[www.cpmamerica.com](http://www.cpmamerica.com)