

CRUNCHED ALUMINUM

Rebuilding a Boeing 747-200B in Alaska



by Dave Stern

JAL 8122 as seen in happier days. (Photo from the AAHS photo archives)

The night of December 16, 1975, was dangerous for both man and machine at Anchorage International Airport, Alaska. Treacherous high winds in the form of a dangerous mini-Chinook (Alaskans called them Aleutian Williwaws), drove mixed rain and sleet at gusts of 40 knots, occasionally reaching 60 knots, which coated the ramps, runways and taxiways with a slick glaze of ice. Japan Air Lines DC-8s and 747s landing daily often departed during the winter nights when no sunlight could melt and evaporate the slick ice coating everything that evening. During this inclement weather the JAL's Boeing 747-200B, JAL 8122, s/n 20924, was pushed by ramp tugs away from the main terminal. It was disconnected and under its own power slowly trundled along the parallel taxiway to the east-west runway. The author observed the aircraft slowly disappear into the darkness.

Shortly thereafter the tower never answered calls to clear a DHC Twin Otter waiting to taxi off the dangerous windy ramp to its base. Instead, a convoy of airport security and other autos plus several fire trucks with their rotating beacons on rapidly moved down the taxiway toward the western end of the runway. It was soon learned that while moving along the taxiway high wind gusts slewed the 747 into a 90-degree rotating turn, due to the huge fin-rudder acting as a weather vane. The aircrew quickly implemented emergency procedures that included shutting down all four engines. Now without power the high

winds and gusts literally shoved the giant aircraft into an uncontrolled rearward skid off the taxiway, through a 13-inch snow-berm, over an embankment and down into a gully. When the 747 finally stopped moving it was found to be straddling the gully with all four engines jammed against the ground, thus preventing any further movement. The violent rear slide injured Captain Kaneda, another crewman and nine of the passengers - fortunately not fatally. They were evacuated off the 747 and taken to the hospital.

"Ragan's Raiders"

During this time period the Boeing Commercial Airplane Co. created a customer support group known as "Ragan's Raiders," officially known as the Boeing AOG (Aircraft on Ground) Team. Their prime duty was to minimize further damage while moving a damaged Boeing transport to a safe area for rebuilding. The team had already accomplished the rebuild of a Boeing 747 at Athens, Greece, completed in December 1975, and now possessed valuable field experience. They were ready when the Boeing Co. immediately dispatched an engineer from their Maintenance and Ground Operations Systems Division (MGOS) who arrived the next day to inspect the aircraft. He examined the severely damaged lower fuselage surfaces and a large quite visible crack running along each side of the 747's spine below the lounge area. Three of the



With its airliner name, logo and registration number obliterated and now representing Nobody Airlines, the JAL 747-200B has its fin-rudder removed. Lower chine crack and one just ahead of the wing-root right up to a side exit door is seen in this photo. (JAL photo)



JAL 8122's severe chin and nose landing gear damage is seen here as the plane is slowly hoisted into the air. Airbags support the wings while the engines appear to have been removed. (JAL photo)



JAL8122 is moored to the east side of the north ramp of Anchorage International Airport after being towed from the gully along the east-west taxiway. (Photo by the author)



The large fuselage crack extending on both sides of the spine is protected from rain and snow until the AOG Team arrives. Heavy support jacks prevent 8122 from shifting during high winds. (Photo by the author)



Damage to the lower aft fuselage is observed in this photo and tail stand to support the tail from shifting during further high winds. (Photo by the author)



Twigs from trees are visible that were jammed into the stabilizer during 8122's violent ride in reverse. It literally mowed down trees during the slide. The photo taken at dusk on the north ramp. (Photo by the author)

four engines were extensively damaged and the horizontal tail surfaces were mauled since they acted like a saw, cutting down trees and saplings during the aircraft's short, violent and undignified rearward slide.

While the Boeing Airplane Co.'s 747 Airplane Recovery Document 06-30014 was being implemented, the first order of business was for others to fulfill that human idiosyncrasy known as "saving face" to avoid as much adverse publicity as possible. Orders were issued for workers to obliterate all airline markings and numbers that included the large red bird painted on the vertical fin of the now crippled government-owned Japan Air Lines 747. The red crane logo seen on the tail of JAL transports is known as genus *Grus* family of *Gruidea*, an Asian wading bird simply known as the crane. It figures in Japanese New Year celebrations and represents longevity and connubial happiness.

Those who lived and worked in Alaska BTOP (before the oil pipeline) knew of and used Alaska's amazing "Bush Telegraph" (bush radio, word of mouth, dog-sled teams traveling between villages, telephones when they worked and bush pilots relaying news during stops, etc.), that speedily hummed with major and personal news throughout the "Greatland." Removing the owner's name and the 747's identification number did not prevent this communication system from rapidly spreading the news to Alaska's highly aviation-oriented citizens spread throughout the state.

Recovery

Meanwhile, temperatures dropped into the sub-zero range literally freezing the huge transport firmly to the ground. Shortly thereafter, bid requests were transmitted to qualified Anchorage-based firms resulting in three companies winning a contract to extract the 747 from its resting place. The three winners were Taylor Rigging, Alaska Asphalt Paving, and Weaver Brothers. They worked out a tripartite plan to extract the aircraft. Since temperatures remained below zero it was necessary to haul special equipment to the ditched plane such as steam generators to thaw the ground. Other workers applied jackhammers to loosen the engines from the frozen earth - a process that spanned 16 days of hard work as crews endured freezing temperatures while tramping through a foot of snow.

Further damage included most of the engine pylons and both stabilizers and elevators. To prevent further weather vane effects from sudden gusting winds, one crane removed the vertical fin-rudder, the tail mounted APU and other sundry items. Boeing advisors suggested building a road encircling the 747 to allow three cranes to be positioned in strategic areas to gently lift it up enough for the damaged landing gear to be removed.

Sixteen sets of 25-ton capacity air bags were placed beneath the wings while a 65-ton crane (reports describe it as a 90-ton crane), and two 145-ton cranes would take the weight of the 747. The two large cranes with slings attached to the wing gear trunions gently lifted, then rotated the aircraft with assistance from the 65-ton crane. All three cranes reportedly lifted roughly 290,000 pounds 10-feet into the air so it could be rotated 90 degrees. This position made it easier for the 747 to

be towed backwards to the north ramp by two Cat 988 loaders - two graders with cables attached to each wing landing gear served as brakes. Since the nose gear had been nearly torn away from its support bulkhead, the nose was chained down to the crossbeams of a logging trailer, then the gully was filled in thus allowing the aircraft to be slowly and carefully towed over it.

A cable was also strung from a small bulldozer to the trailer supporting the nose and it did the steering. East-west runway traffic (the most heavily used until an extended north-south runway was completed later), was closed for 2.5 hours until the 747's wing cleared the runway - the aircraft was steered to the east side of the north ramp and moored to the concrete. The damaged port and nose landing gear necessitated the use of special Boeing-modified gear legs to replace the damaged unit in order to move the aircraft.

Rebuild

Meanwhile, JAL management suffered apprehensions when they discovered that the price of a replacement...a new factory fresh 747-200B was approximately \$35 million give or take a few dollars. Intense meetings between JAL management and their insurance representatives concluded that it was cheaper to rebuild 8122 on the spot. The team was put on notice to prepare for travel to Alaska, as it secured the bid to rebuild the plane on-site.

It was also noted that despite being the prime manufacturer of the 747 series aircraft, the FAA still required Boeing to complete the legal paperwork necessary for them to be issued an FAA approved Satellite Repair Station Certificate before the AOG Team could begin their work. No problems were incurred with the paperwork and the certificate was then issued. The state of Alaska, city of Anchorage, mosquitoes and the "no-sees-ums" thus hosted Boeing's largest and most expensive airliner rebuild project several thousand miles from its birthplace and, in addition, beat the rapidly approaching winter.

Boeing Everett engineers wisely decided to replace certain damaged segments and parts of the 747 by jig - building complete sections on their 747 production line. Subcontractors received communications ordering them to create sections of the damaged fuselage areas from the cabin floor down, then crate and ship them to the Everett plant. They were received as panel sections and were built-up using the line production tooling as a regular assembly but isolated separately from the on-going 747 line. Substructures and parts were installed at that isolated area thus reducing time spent in the field installing them...this included all sections and the cargo handling system in fuselage section 42 thus creating an unusually large and heavy section ready for crating.

Boeing created air-tight shipping containers to protect the built-up sections from salt water corrosion and damage during the sea voyage to Anchorage. The largest built-up unit was the lower fuselage section at 72 feet in length, 21 feet wide, 12 feet high weighing in at 60,000 pounds. Such large 747 segments were built into the production line aircraft but had not previously been shipped out of the factory by themselves. Special arrangements were made for them to travel a mere 1.6



The AOG Team at work. Cranes have removed the rear fuselage and tail assembly to facilitate major repairs. Forward fuselage scaffolding is seen on each side of the giant mid-fuselage crack. (Photo by the author)



The sun slowly sets as the JAL 747 undergoes major repairs — a JAL cargo container provides 747 parts from its home base in Japan. (Photo by the author)



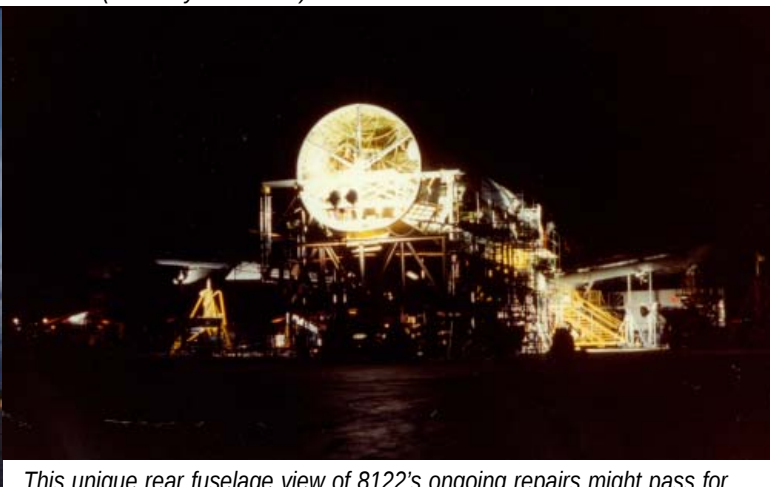
Huge jacks and cross-beams are all that support the front of JAL8122 as skin, stringers, formers and forgings are removed and replaced. The AOG Team was divided into two 12-hour shifts and worked hard to beat the rapidly approaching cold autumn nights so common to Alaska. (Photo by the author)



This night photo displays the interior of 8122 up to the bulkhead or wing spar including several coiled wiring harnesses. The forward formers and stringers are still being fitted and riveted in place during the mid-point of the rebuild process. The port and starboard mooring cables are also visible. (Photo by the author)



Several workers are seen in this photo taken weeks later showing the new replacement formers, stringers and skins painted zinc-chromate yellow. Plenty of lighting was positioned where necessary aiding the AOG night crew in their work. (Photo by the author)



This unique rear fuselage view of 8122's ongoing repairs might pass for a spacecraft being prepared for mating to a booster rocket. The closest support beam penetrates fuselage and sits atop the port and starboard support jack-stands. The lower rear fuselage section has been jacked up and tacked to the fuselage itself. (Photo by the author)

miles from the Everett plant, and negotiate a 5.6% grade in order to arrive at the Mukilteo, Wash., docks. At Mukilteo the rail cars had to be shifted six inches to clear a building in order to reach the dock.

The large heavy segments were then lifted by crane onto a cargo barge for a short 30-mile water voyage south to the Port of Tacoma, immediately south of Seattle proper. The containers were loaded aboard a cargo ship that arrived in Anchorage a few days later. Additionally, there was far more equipment accompanying this shipment such as 42 tractor-trailer loads of tools. The repair materials, equipment and the large sections totaled approximately 500,000 pounds, although 65,000 pounds of it were shipped by air. The arrival of the Boeing AOG Team was met by untold numbers of recently-born mosquitoes just waiting for some fresh *Chechakho* blood, not to mention their competitors - Alaska's infamous "no-see-ums."

With shifts working out of rented ATCO Trailers positioned around the 747, 100-plus Boeing employees could sleep on site; additionally, floodlights were turned on during the short summer nights. The crew worked around the clock expecting to beat Alaska's short summer so that JAL pilots could fly it to Japan for painting and interior work. To more easily facilitate the rebuild process, the 747 was positioned into the prevailing wind, moored to the ramp and steel beams run through the windows with special fittings; this lash-up was then laser aligned for trueness - before initiating the rebuild process. The damaged lower fuselage section was loosened and detached from the fuselage then lowered to the ground.

The container with the built-up fuselage section was positioned immediately beneath the area of the 747's belly where it was slowly jacked up inches at a time, then shored whenever the process had to be stopped. Once that large section was aligned with the lower fuselage it was then attached. This

replacement method resulted in a fuselage that was extremely close to specifications and was found to be truer than any 747 under construction at the Everett plant. Japan Air also saved further expenditures by making extensive use of their spare parts inventory in Japan rather than purchasing new parts from Boeing.

The P&W JT9D-7FW turbofans were shipped to JAL and overhauled in their engine shop. The engines were attached to the inboard wing near the wing-root of JAL 747s flying to Anchorage and delivered to the AOG Team. The airline saved further monies by repainting and installing the galleys, interior and seats at their home base. A Boeing report stated that nearly 20,000 parts were used during the rebuild on site and the overall estimates were \$21 million, for a savings of \$14 million-plus dollars for a new 747-200B. In September 1976, the "month of the Small Moon" (Tlingit Indian Calendar), a Boeing test pilot putting the 747 through its paces around Cook Inlet at Anchorage, stated that it displayed better handling characteristics than other 747s he had tested.

Boeing 747-200B bearing the Identification JAL 8122 and being serial number 20924 exited the 747 production facility and was test flown on March 21, 1974. On March 29, 1974, JAL aircrew officially took delivery of the aircraft and flew it to Japan. Upon completion of its rebuild in Anchorage, it reentered service and was later purchased by UF Finance in January 1996, bearing the new registration of N550SW. It was, in turn, leased in March 1996 by Air Atlanta Icelandic as TF-ABI. It also served in the colors of Saudi Airlines, Air Iberia and Airtours. The bird finally returned to its nation of birth and was last known awaiting its turn to be stripped of valuable parts and accessories then rendered into aluminum ingots for industrial use.



JAL8122 is now complete along with four newly mounted 50,000-pound thrust P&W JT9D-7FW turbofans. Numerous details are being attended to before the newly rebuilt 747 makes its initial test flight around Cook Inlet bordering the west end of Anchorage International Airport. (Photo by the author)