Lake Mead B-29 Inspection After Action Review

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Date of Operation	October 30-31, 2002
Location:	Lake Mead, NV USA
Operation:	B-29 Underwater Crash Scene Investigation
ROV Pilot:	Bob Christ
Wreck Inspected:	*Boeing B-29 S/N 45-21847*
Observed Wreck Depth:	Approximately 181 ffw [feet fresh water] (55.2 meters)
Underwater Visibility:	Approximately 6-8 feet (2-3 meters)
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Introduction:

The above referenced aircraft experienced controlled flight into the waters of Lake Mead while in flight in July,1948. A SeaTrepid representative was called into this project by the US National Park Service to do an initial wreck site assessment with our Remotely Operated Vehicle system.

The purpose of this report is to outline the ROV operator's (Bob Christ) as well as the B-29 consultant's (C.J. Christ) estimate of the site as well as possible theories as to the cause and results of the accident based upon the evidence observed.

Operation:

The Micro-ROV was deployed from the starboard side quarter of a houseboat anchored approximately 50 feet from overhead the wreck site (port side quarter of the wreck). A VideoRay Pro II system equipped with a 675 kHz scanning sonar was used for the initial location of the wreck on the initial deployment.

General Observations are as follows:

1. The wreck rests on the bottom (bottom of the aircraft to the silt) with the longitudinal axis of the aircraft facing approximately 330 degrees true. The bottom of the left wing is above the silt while the bottom of the right wing is buried in the silt.
2. #1 engine is the only engine still attached to the nacelle – its propeller in the feathered position with the ends both curled and broken.
3. #2, #3 and #4 engines were torn from their mounts with the associated cowling missing.
4. The left side landing gear was in the up and locked position. The left side gear doors were ripped from their mounts. The nose and right gear were inaccessible by VideoRay due to burying in the silt.
5. The nose section of the aircraft was open and splayed.

6. The forward bomb bay was accessible by VideoRay with the bomb bay doors ripped from their mounts.
7. The fuselage was ruptured just aft of the scanners location from the bottom of the aircraft in an upward direction.
8. The empennage of the aircraft was generally undamaged with the exception of the tail cone missing exposing the rear fuselage to the outside.
9. The left wing tip was damaged at the extreme front edge.
10. The right wing was generally undamaged.
11. All leading edges of both wings appear to be generally undamaged.
12. Fabric surfaces of the flight control surfaces (rudders, elevators and ailerons) were mostly corroded and/or dissolved.
13. Flaps were in the "Up" position.
14. Ailerons were observed hard-over in the full "Right Wing Down" position.
15. Rudder was observed in the hard-over "Left Full Rudder" position.
16. Elevator was resting in the full nose-down position.
17. Previous divers left 3 sets of lights made generally of PVC piping, batteries and light bulbs. The locations of those 3 lights were as follows: a) just forward of the co-pilot's window on the silt resting 4 feet from the fuselage, b) sitting atop the right-side horizontal stabilizer 3 feet from the tip of the stabilizer, and c) just aft of the right side elevator 8 feet aft from the tip of the right elevator. The light in c) was recovered with the VideoRay.

Fuselage openings were as follows:

1. Opening of the nose section apparently through damage from water contact.
2. Opening of the pilot's side escape hatch apparently by the crew during escape.
3. Opening of the co-pilot's side escape hatch apparently by the crew during escape.
4. Forward bomb bay open due to bomb bay door separation.
5. Opening of the Navigator's dome was slid aside atop the fuselage for unknown reasons.
6. Rupture of the fuselage just aft of the scanners' locations. Note: A "mushroom" anchor probably from a boat on the surface was wedged into the fuselage on the right side at the fuselage rupture. In excess of 200' of braided Nylon line was seen to lie on the bottom snaking in a generally Easterly direction away from the wreck.
7. Separation of the empennage at the junction of the vertical stabilizer and the fuselage.
8. Separation of the tail cone just aft of the [former] tail gunner's station.

Wing openings were as follows:

1. Gear doors on the #2 engine were separated exposing the left main gear. The cowling on the underside nacelle of #2 was open to the trailing edge of the wing.
2. #2, #3 and #4 engines and accessories were missing to the firewall.

Results and Summary:

1) The accident involved controlled flight into water.
2) The most likely cause of the accident is pilot loss of depth perception due to glassy water surface conditions at the time of the accident (please refer to the accident report as well as FAA Publication Advisory Circular AC 61-2A Chapter 15 Section XII [http://www.seaplanes.org/library/govtpubs/AC61-21A.pdf] for more information on

the conditions at the time of the accident as well as concept of "Glassy Water Landings").

3) Once the aircraft contacted the water, it would appear that the #2-4 engines were separated at that point – probably due to orientation of the propellers at the time of impact.
4) Due to the loss of 3 engines, the center of gravity of the aircraft would have experienced an immediate and significant shift aft (computation of which is easily discernible, but we will leave for another analysis) likely causing a violent pitch up (nose up) as well as a significant yaw and roll into the #1 engine (to the left).
5) Due to the full right deflection of the ailerons, the nose of the aircraft would have drifted initially yaw-left (due to adverse yaw) then would have reacted yaw-right once the rudder had taken over.
6) The asymmetrical drag of the #1 engine appears to have been mitigated by the pilots feathering of the #1 engine (the position of the pilot's propeller controls were not ascertained due to a parachute draped over the pilot's engine controls).
7) The roll tendency of the aircraft to the left with only the #1 engine would have been significant requiring the pilots to apply full right aileron to keep the left wing level and maintaining controlled flight.
8) The aircraft's longitudinal axis probably departed the direction of flight causing the pilot to counteract with rudder. Since the wreck was found with full left rudder deflection, the effort to keep the left wing level probably caused the nose of the aircraft to swing right requiring a last-minute rudder correction.
9) Due to the damage to the bottom side of the aft fuselage and the loss of the tail cone, the aircraft appears to have contacted the water at or below the stall speed in a very nose-high attitude causing loss of the tail cone as well as the damage just aft of the scanners stations.
10) The damage to the left wing at the position of the running lights appears to have been due to the aircraft contacting the water on the second contact in a "left wing low" attitude.
11) The left wing contacting the water first would have caused an immediate yaw and turning moment to the left changing the orientation of the wreck from it's Southerly flight direction swinging left to the NNW orientation as it lies today on the bottom.
12) The damage to the fuselage just forward of the junction of the vertical stabilizer and the fuselage appears to be due to the collision of the aircraft with the bottom upon final contact.
13) The Flight Engineer's engine control console showed throttle positions to be full open on all 4 engines as well as mixtures full-rich on #1 engine only. The position of mixtures for engines #'s 2-4 varied from very lean to cut-off. One possible cause for this would be for the crew's desire to keep the #1 engine turning long enough for the propeller to come to the feather position.
14) The propeller blades on the #1 engine were broken at the tips and curled in such a direction as to indicate sudden stoppage of the propeller due to contact with the water while the propeller may have been feathered. It appears that the propeller was broken at the ends perhaps at the first contact with the water then experienced sudden stoppage – perhaps while still turning – on the second contact with the water. The general rule with propeller contact with water is bent forward if the engines were generating positive thrust and bent back if zero or little thrust.

For questions on this report, please field all correspondence through Brett Seymour of NPS. The opinions, conclusions and speculations of this report are of the **authors' only** and should not be construed as official pronouncement or conclusions of the National Park Service, SeaTrepid LLC or any other governing organization.