

The Zero Myth

by Roy Day

MYTH: *A story of unknown authorship, ostensibly with a historical basis; any fictitious story.*

Some aviation historians have recorded the Japanese Zero fighter of World War II as practically invincible. The facts suggest otherwise.

The development of the Zero began in 1937 to satisfy the Japanese Imperial Navy requirement for a shipboard fighter with long range and a top speed of 310 mph. Mitsubishi was the only company to respond to the challenge. The Zero first flew in 1939 and extended the top speed requirement as well as achieving a range of nearly 2000 miles. This performance for a shipboard fighter was better than the Japanese land-based planes. The Zero, built of aluminum and without any armor protection, had a light wing loading. Despite stories to the contrary, no wood was used in the construction.

The Zero first saw combat in the Japanese war with China in 1940. In these battles it downed all opposition. In one year Zeros shot down more than 100 Chinese planes with no losses. This was the origin of its reputation as being invincible. However, the outmoded biplane fighters of the Chinese were clearly inferior and no match for the Zero.

Although the Zero had been in combat for a year before the Japanese attack on Pearl Harbor on December 7, 1941, the U.S. was surprised at its performance. Prior to Pearl Harbor, there was a feeling within the U.S. military that the Japanese aircraft were generally inferior. In the months following Pearl Harbor, the Zero continued to score successes. Its pilots were especially well trained in aerobatics and excelled in traditional dogfighting with the low wing loading of the Zero. The result was regular reports of downed Allied planes across the Pacific. The reputation of the Zero continued to grow. In February, 1942, the Royal Australian Air Force (RAAF) lost 11 of 13 Brewster Buffalo fighters to Zeros in one air battle. Other obsolete aircraft like the P-35, P-36 beside the Buffalo were no match. Even the Curtis P-40 and the Spitfire of the RAAF suffered losses when the pilots tried to dogfight on the Zero's terms. With its low wing loading and excellent pilot capability, this is where this Japanese aircraft excelled. But earlier, General Claire Chenault of Flying Tigers fame had fought Zeros in China with his Curtis P-40's and scored good success against them. In one air battle, the Flying Tiger P-40's met a formation of Zeros and destroyed 17 without a single loss. What was different? The Flying Tigers had discovered a weakness in the capability of the Zero

and they exploited it to their advantage. It could not engage in a high speed diving rolling attack with the P-40. What was this weakness?

A breakthrough in knowledge came when the U.S. captured a flightworthy Zero in the Aleutians in June 1942.¹ Exhaustive flight tests by U.S. pilots showed it to have excellent maneuverability at speeds of less than 150 MPH. However, aileron control became sluggish at 180 MPH and practically ineffective at 230 MPH. The top speed in a dive was about 350 MPH compared to the top dive speed of the Navy Grumman F6F fighter of 515 MPH. Furthermore, the Zero was built of a type of aluminum that was very brittle. A burst of machine gun fire or a 20 mm cannon shot in the aft fuselage was all that was needed to break up the airplane. There was also no armor to protect the pilot, as was customary in Allied fighters.

Once these weaknesses were known and understood, the U.S. and other Allied pilots changed their aerial tactics to diving rolling attacks. By the fall of 1942, only a few months after the capture and testing of the Zero, Grumman F4F Wildcats using these new tactics destroyed most of the Zeros over Guadalcanal. This was in spite of the fact that the F4F was older in design but was more rugged and heavily armed. Navy and Marine pilots flying the F4F's were instructed not to allow the Japanese to use their excellent aerobatic advantages but to "dive at full throttle and roll." As the Pacific War continued aerial tactics against the Zero were refined and gained even more successes for the U.S. By the end of the war, the Grumman F6F Hellcat kill ratio against the Zero was 19 to 1. In addition, the U.S. brought out the F4U Corsair and the Lockheed P-38 which were unquestionably superior.

The question is why didn't the Japanese upgrade the Zero during the war as losses mounted? Both the Allied and German fighters were upgraded during the war years. For example, the horsepower of the Spitfire was nearly doubled from that of the early airplanes. In contrast, the Zero only gained about 200 HP in an engine upgrade. Late in the war, armor protection was incorporated to protect the pilot and self-sealing fuel tanks were installed, but these only subtracted from the small performance margin gained by the engine upgrade. The basic problem seemed to be the Japanese Imperial Navy's insistence on long range and maximum maneuverability (low wing loading). Also, as the war continued, the heavy losses of Japanese pilots resulted in replacements who were poorly trained. This further aggravated the declining combat record.

Was the Zero as invincible as reported by some?

¹) Link to a short article about a PBY Catalina finding the downed Aleutian Zero in *Sport Aviation On-line*, May 2014 issue. http://www.sportaviationonline.org/sportaviation/may_2014#pg62

No, not at all. It was a good fighter for the old style of dogfighting but no match for the Allied fighters once they altered their aerial combat tactics to exploit its weaknesses.



According to Wiki, this is a picture of the Zero that was recovered on Akutan Island, Aleutians, in 1942.