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COMBAT EVALUATION OF ZEKE 52
WITH FAU-1D, F6F-5, AND FM-2

REPORT BY:
U. S. NAVAL AIR STATION
PATUXENT RIVER, MD.

ISSUED BY THE DIVISION OF NAVAL INTELLIGENCE
BY
COMBINED PERSONNEL OF UNITED STATES AND BRITISH SERVICES
FOR THE USE OF ALLIED FORCES

TECHNICAL AIR INTELLIGENCE CENTER
NAVAL AIR STATION
ANACOSTIA, D.C.

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INTRODUCTION

Aircraft TA1C #5, a Zeke 52, was captured on D+1 during the invasion of Saipan by a Technical Air Intelligence team. The plane was shipped on a CVE to San Diego where a flight check was made at the Naval Air Station. It was then flown to Technical Air Intelligence Center for minor repairs, after which it underwent tactical test against Navy fighters at N. A. S. Patuxent River. The following report represents the results of this test.

Another Zeke 52, now being rebuilt at T.A.I.C. will soon undergo tactical test against Army aircraft at Eglin Field.

U. S. NAVAL AIR STATION
PATUXENT RIVER, MD.

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To: Chief of the Bureau of Aeronautics.

Subj: Project TED No. PTR - 1111, Comparative Combat Evaluation Trials of Japanese Zeke 52 Fighter, Report of.

1. A report of the subject trials is submitted herewith.

by direction of the Commanding Officer.

M. H. TUTTLE,
Comdr., U.S.N.

PROJECT TED NO. PTR - 1111

REPORT OF COMPARATIVE COMBAT EVALUATION TRIALS OF JAPANESE ZEKE 52 FIGHTER

Ref: (a) BUAEr Conf. Ltr., AER-E-11-JFS, serial no. C21309, of 9 August 1944.

1. In accordance with the reference, comparative combat evaluation trials of the Japanese Zeke 52 Fighter have been conducted by Tactical Test and are reported on herein. The comparisons were made with production models of the F4U-1D, F6F-5, and FM-2 fighters. All of the airplanes were loaded to their "standard fighter" weights, as indicated in enclosure (1).

2. The program for the tests was essentially as outlined in enclosure (2), the data obtained being of a qualitative rather than a quantitative nature. Climbs were made at full military power at each airplane's best climbing speed. Speed runs were made at full available power every 5,000 feet from sea-level to 30,000 feet, the F4U-1D, F6F-5, and FM-2 using War Emergency Power. Rolls, turns, dives, maneuvers, mock combat, and general characteristics were tested at various altitudes. Pilots were rotated in their assignment to aircraft in order to obtain a better cross-section of opinion.

3. The Zeke 52 tested was powered by a Nakajima SAKAE 31A engine, not equipped with water injection. The cockpit arrangement was quite good, with the exception of the landing gear and flap controls. The airplane was easy to fly, except for excessively high control forces at high speeds. At speeds around 160 knots the controls tightened, and at speeds over 200 knots the control forces became objectionably heavy, especially in the ailerons.

There was a very marked stall warning, the tail stalling about ten knots before the wings, causing a noticeable buffet.

The airplane was considered to be quite stable:

The steep angle of climb of the Zeke 52 gives it the appearance of a very high rate of climb, but its relatively slow climbing speed brings its actual rate below the expected value.

A slightly better turn to the left than to the right was noted at all altitudes.

Excessive vibrations were noted in dives at speeds above 250 knots.

Direct comparisons between the Zeke 52 and the F4U-1D, F6F-5, and FM-2 are given in sections A, B, and C, following:

A. Zeke 52 vs. F4U-1D

CLIMB

The best climb of the F4U-1D was equal to that of the Zeke 52 up to 10,000 feet, about 750 ft/min better at 18,000 feet, and about 500 ft/min better at 22,000 feet and above.

The best climbing speeds of the F4U-1D and Zeke 52 were found to be 135 and 105 knots indicated, respectively.

SPEEDS

The F4U-1D was much faster than the Zeke 52 at all altitudes.

At sea-level the F4U-1D was 48 mph faster than the Zeke 52.

At 5,000 feet the F4U-1D was 42 mph faster than the Zeke 52.

At 10,000 feet the F4U-1D was 58 mph faster than the Zeke 52.

At 15,000 feet the F4U-1D was 70 mph faster than the Zeke 52.

At 20,000 feet the F4U-1D was 78 mph faster than the Zeke 52.

At 25,000 feet the F4U-1D was 80 mph faster than the Zeke 52.

At 30,000 feet the F4U-1D was 74 mph faster than the Zeke 52.

Top speeds attained were 413 mph at 20,400 feet for the F4U-1D, and 335 mph at 18,000 feet for the Zeke 52.

ROLLS

Rolls of the Zeke 52 were equal to those of the F4U-1D at speeds under 200 knots and inferior above that speed, due to the high control forces.

TURNS

The Zeke 52 was greatly superior to the F4U-1D in slow speed turns at low and medium altitudes, its advantage decreasing to only a slight margin at 30,000 feet. In slow speed turns it could gain one turn in three and one-half at 10,000 feet. At speeds around 175 knots, however, the F4U-1D could, by using flaps, stay with the Zeke 52 for about one-half turn, or until the speed fell to 150 knots.

DIVES

Initial dive accelerations of the Zeke 52 and F4U-1D were about equal, after which the F4U-1D was far superior.

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The F4U-1D was slightly superior in zooms after dives.

VISION

The Zeke 52 was considered to permit better vision in all respects, the rear vision being good due to the use of a bubble canopy and the complete absence of armor behind the pilot's head. There was no rear vision mirror installed in the Zeke 52 tested. The small gun sight did not interfere with forward vision.

MANEUVERABILITY

The maneuverability of the Zeke 52 is remarkable at speeds below about 175 knots, being far superior to that of the F4U-1D. Its superiority, however, diminishes with increased speed, due to its high control forces, and the F4U-1D has the advantage at speeds above 200 knots.

SUGGESTED TACTICS

The following tactics are suggested for use against the Zeke 52 by the F4U-1D:

DO NOT DOG-FIGHT WITH THE ZEKE 52.

DO NOT TRY TO FOLLOW A LOOP OR HALF ROLL WITH PULL-THROUGH.

When attacking use your superior power and high speed performance to engage at the most favorable moment.

To evade a Zeke 52 on your tail, roll and dive away into a high speed turn.

B. ZEKE 52 vs F6F-5

CLIMBS

The Zeke 52 climbed about 600 ft/min better than the F6F-5 up to 9,000 feet, after which the advantage fell off gradually until the two aircraft were about equal at 14,000 feet, above which altitude the F6F-5 had the advantage, varying from 500 ft/min better at 22,000 feet to about 250 ft/min better at 30,000 feet.

The best climbing speeds of the F6F-5 and Zeke 52 were found to be 130 and 105 knots indicated, respectively.

SPEEDS

The F6F-5 was much faster than the Zeke 52 at all altitudes.

At sea-level the F6F-5 was 41 mph faster than the Zeke 52.

At 5,000 feet the F6F-5 was 25 mph faster than the Zeke 52.

At 10,000 feet the F6F-5 was 45 mph faster than the Zeke 52.

At 15,000 feet the F6F-5 was 62 mph faster than the Zeke 52.

At 20,000 feet the F6F-5 was 69 mph faster than the Zeke 52.

At 25,000 feet the F6F-5 was 75 mph faster than the Zeke 52.

At 30,000 feet the F6F-5 was 66 mph faster than the Zeke 52.

Top speeds attained were 409 mph at 21,600 feet for the F6F-5, and 335 mph at 18,000 feet for the Zeke 52.

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ROLLS

Rolls of the Zeke 52 were equal to those of the F6F-5 at speeds under 200 knots and inferior above that speed, due to the high control forces.

TURNS

The Zeke 52 was greatly superior to the F6F-5 in slow speed turns at low and medium altitudes, its advantage decreasing to about parity at 30,000 feet. In slow speed turns it could gain one turn in three and one-half at 10,000 feet.

DIVES

Initial dive accelerations of the Zeke 52 and F6F-5 were about equal, after which the F6F-5 was far superior.

The F6F-5 was slightly superior in zooms after dives.

VISION

The Zeke 52 was considered to permit better vision in all respects, the rear vision being good due to the use of a bubble canopy and the complete absence of armor behind the pilot's head. There was no rear vision mirror installed in the Zeke 52 tested. The small gun sight did not interfere with forward vision.

MANEUVERABILITY

The maneuverability of the Zeke 52 is remarkable at speeds below about 175 knots, being far superior to that of the F6F-5. Its superiority, however, diminishes with increased speed, due to its high control forces, and the F6F-5 has the advantage at speeds above 200 knots.

SUGGESTED TACTICS

The following tactics are suggested for use against the Zeke 52 by the F6F-5:

DO NOT DOG-FIGHT WITH THE ZEKE 52.

DO NOT TRY TO FOLLOW A LOOP OR HALF ROLL WITH PULL-THROUGH.

When attacking use your superior power and high speed performance to engage at the most favorable moment.

To evade a Zeke 52 on your tail, roll and dive away into a high speed turn.

C. ZEKE 52 vs FM-2

CLIMB

The best climb of the Zeke 52 was about 400 ft/min less than that of the FM-2 at sea-level, became equal at about 4,000 feet, was 500 ft/min better at 8,000 feet, became equal again at 13,000 feet, and was only slightly inferior above 13,000 feet.

The best climbing speeds of the FM-2 and Zeke 52 were found to be 120 and 105 knots indicated, respectively.

SPEEDS

The Zeke 52 was progressively faster than the FM-2 above 5,000 feet.

At sea-level the FM-2 was 6 mph faster than the Zeke 52.

At 5,000 feet the FM-2 was 4 mph slower than the Zeke 52.

At 10,000 feet the FM-2 was 12 mph slower than the Zeke 52.

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At 15,000 feet the FM-2 was 8 mph slower than the Zeke 52.

At 20,000 feet the FM-2 was 19 mph slower than the Zeke 52.

At 25,000 feet the FM-2 was 22 mph slower than the Zeke 52.

At 30,000 feet the FM-2 was 26 mph slower than the Zeke 52.

Top speeds attained were 321 mph at 13,000 feet for the FM-2, and 335 mph at 18,000 feet for the Zeke 52.

ROLLS

Rolls of the Zeke 52 were equal to those of the FM-2 at speeds under 160 knots and inferior above that speed, due to the high control forces.

URNS

Turns of the FM-2 and Zeke 52 were very similar, with a slight advantage in favor of the Zeke 52. The Zeke 52 could gain one turn in eight at 10,000 feet.

DIVES

The Zeke 52 was slightly superior to the FM-2 in initial dive acceleration, after which the dives were about the same.

Zooms after dives were about equal for the Zeke 52 and FM-2.

VISION

The Zeke 52 was considered to permit better vision in all respects, the rear vision being good due to the use of a bubble canopy and the complete absence of armor behind the pilot's head. There was no rear vision mirror installed in the Zeke 52 tested. The small gun sight did not interfere with forward vision.

MANEUVERABILITY

The maneuverability of the Zeke 52 is remarkable at speeds below about 175 knots, being slightly superior to the FM-2. Its slight superiority, however, diminishes with increased speed, due to its high control forces, and the FM-2 has the advantage at speeds above 200 knots.

SUGGESTED TACTICS

The following tactics are suggested for use against the Zeke 52 by the FM-2:

DO NOT DOG-FIGHT WITH THE ZEKE 52.

Maintain any altitude advantage you have.

To evade a Zeke 52 on your tail, roll and dive away into a high speed turn.

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Approved:

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Tactical Test Officer.

LOADING SCHEDULE FOR COMPARATIVE TESTS

<u>ZEKE 52</u>		<u>F4U-1D #57432</u>	
Basic Weight	4387	Basic Weight	9223
Crew	200	Crew	200
Fuel - 156 gal.	936	Fuel - 230 gal.	1380
Oil - 12 gal.	78	Oil - 20 gal.	150
Armament:		Armament:	
2 Mk II 20mm M.G.	167	6 .50 cal M.G.	356
200 rnds ammo.	166	2350 rnds ammo.	705
2 7.7 mm M.G.	55		
1400 rnds. ammo.	105		
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TOTAL AS FLOWN:	6094 lbs.	TOTAL AS FLOWN:	12014 lbs.
<u>F6F-5 #58992</u>		<u>FM-2 #57355</u>	
Basic Weight	9389	Basic Weight	5672
Crew	200	Crew	200
Fuel - 250 gal.	1500	Fuel - 117 gal.	702
Oil - 16 gal.	120	Oil - 11 gal.	83
Armament:		Armament:	
6 .50 Cal M.G.	356	4 .50 cal M.G.	237
2400 rnds ammo.	720	1721 rnds ammo.	516
<hr/>		<hr/>	
TOTAL AS FLOWN	12285 lbs.	TOTAL AS FLOWN	7410 lbs.

Enclosure (1) One of One.

PROGRAM FOR COMPARATIVE TESTS FOR ZEKE 52 vs. F4U-1D, F6F-5, FM-2**I. Preliminary:**

- A. Check loading, weight, instrumentation, general condition.
- B. Calibrate all airspeed indicators.
- C. Thoroughly familiarize pilots.

II. Specific Trials:

- A. At altitudes of 200, 5,000, 10,000, 15,000, 20,000, 25,000, 30,000 ft:
 1. Two-minute all-out speed runs.
 2. Rolls - high and low speeds - level, climbing, diving.
 3. Turns - high and low speeds - same and opposite headings.
 4. Dives - speed, acceleration, pull-outs, zooms after, control forces.
 5. Stability and controllability - general control forces and trim.
 6. Maneuverability and response.
- B. At convenient altitudes:
 1. Climb to S.C. at own best and other airplane's best speed.
 2. Angles of vision - forward, rearward, downward - obstructions.
 3. General mock combat.

III. General:

- A. General pilot's opinions of relative merits.
- B. Suggested tactics to be used against Zeke.

Enclosure (2) One of One.



FIGURE 1. Zeke 52 in flight.

FIGURE 1. Zeke 52 in flight.