

**ARMY AIR FORCES
AIR TECHNICAL SERVICE COMMAND**

**MEMORANDUM REPORT ON
Zeke 52 Airplane No. EB-2**

TSFER/PFB/hwp/2-6275

Date 13 March 1946

SUBJECT: Pilots' Comments on Zeke 52
Airplane No. EB-2.

OFFICE TSFER

Contract or Order No. _____
Classification _____

SERIAL No. TSFER-1973

Expenditure Order No. _____

UNCLASSIFIED
by authority of CG
DATE 25/10/94

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Capt USAF*

A. Purpose

1. To forward pilots' comments on the Zeke 52 airplane No. EB-2.

B. Factual Data

1. Introduction

a. The Zeke 52 is a low wing, single seat, single engine fighter built by Mitsubishi of Japan powered by a 14 cylinder, radial air cooled, Nakajima Sakae, Type 31, engine driving a three blade, Hamilton Standard, constant speed propeller. Comments are based on a total of sixteen flights comprising 15:55 hours of flying time by pilots of the Fighter Test Section during partial performance tests of the airplane. Full performance on the airplane was not completed because difficulties with maintenance encountered were prohibitive.

2. Weight and C. G. Information

a. The airplane was flown at a gross weight of 5,544 pounds with normal c.g. location. Guns were carried but no ammunition nor ballast was included. American radio and oxygen equipment was installed where possible as well as standard AAF instruments.

3. Flight Characteristics

a. Cockpit Layout - Arrangement of the cockpit in regard to flight and engine instruments is considered good. All instruments are properly grouped and easily read. Other aspects of the cockpit vary from excellent to poor. Location of flaps and landing gear controls on the right side of the pilot's seat makes for extremely awkward operation, particularly in view of the rather complicated sequence of required operations. Seat adjustment is adequate but adjustment of the rudder bar is lacking, even for the shortest of American pilots. Brakes cannot be applied with the rudder in extreme positions. The indicator light system for landing gear position is excellent, for, a separate light is provided for each gear in the "locked up", "locked down", and "intermediate" positions. Cockpit light at right forward corner of the cockpit interfered with normal operation of the cowl flap control and frequently skinned the pilot's hand. All electrical switches are located in the lower left front of the cockpit in a position difficult to reach and observe.

b. Ground Handling - The non-steerable, free swivel tail wheel caused the airplane to be difficult to handle on the ground. Directional control during taxiing had to be maintained by continuous use of brakes, a feature which resulted in excessive trouble with the already inadequate brake system. The left landing gear on the airplane was slightly out of line and probably contributed to ground handling difficulties.

c. Take-off and Initial Climb - Directional control during take-off is satisfactory with sufficient rudder effectiveness at a low speed of 30 MPH to offset torque effect. Rudder trim for climb is inadequate and pressure must be held on the right rudder to maintain trim. Gear retraction is slow and care should be taken not to let the speed build up before the gear is retracted. Take-off run is exceptionally short, the airplane usually becoming airborne before full power can be applied. The initial climb is steep and visibility straight ahead poor. Visibility in other directions is adequate.

d. Climb - Rate of climb at low altitudes is very good, being at 3,600 feet per minute at the best climbing speed of approximately 135 MPH. Rudder trim is still slightly inadequate at this speed necessitating constant slight right rudder pressure.

e. Handling and Control at Various Speeds - All controls are excellent at speeds up to 300 MPH indicated. Rudder and elevator forces are normal at all speeds but increasing aileron stiffness is apparent until at 300 MPH aileron forces are excessive.

f. Trim and Stability - Rudder and elevator trim only are provided. Elevator trim is adequate for all conditions. Rudder trim for take-off and climb is inadequate and up to speeds of 170 MPH pressure on the rudder bar is required to maintain trim. Above this speed sufficient trim is available. Lateral trim can be maintained by proper use of fuel from the wing tanks. The overall stability of the airplane is exceptional under all conditions, yet is not excessive to the point of decreasing its extreme maneuverability.

g. Stalls and Stall Warnings - In the landing configuration, power off, the airplane stalls at 68 MPH. Ample stall warning occurs in the form of a control buffet at approximately 3 MPH before the actual stall. The stall is clean and straight ahead and recovery may be rapidly affected with little loss in altitude. In the clear condition, the stall occurs at 74 MPH and is accompanied by a tendency to roll to the left. Ample warning to the stall is apparent and recovery is easy.

h. Maneuverability and Acrobatics - At speeds below 250 MPH the maneuverability of the airplane is superior to that of any AAF fighter. Rate of roll is good and radius of turn is exceptional. Acrobatics are easily performed and loops, Immelmans, slow rolls, etc., may be satisfactorily executed from straight and level cruising flight. Above 250 MPH maneuverability is definitely affected by increasing stiffness of the ailerons, and rolls, in particular, become more and more difficult to execute.

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i. Changes in Trim When Operating Landing Gear and Flaps - As the landing gear is lowered, the airplane becomes slightly nose heavy. Ample trim is available to compensate for this change in trim. Flap operation has a negligible effect on longitudinal trim.

j. Noise and Vibration - Noise level in the airplane is comparable to AAF fighters and is not considered excessive. Vibration was slightly above normal and considerably amplified by engine roughness that was encountered on many of the flights.

k. Comfort - Cockpit, as a whole, is considered normally comfortable for fighter aircraft with the exception of the rudder controls not having adequate adjustment for average American pilots.

l. Vision - Position of pilot affords ample all-around vision for taxi, take-off, and landing. Distortion in wind screen and canopy is negligible. Due to the aircraft not having been flown at night no information is available as to night flight, however, it is thought that vision would be suitable due to lack of curved surface in wind screen and canopy.

m. Approach and Landing - An approach glide speed of 100 MPH reduced to 75 - 80 for flare out is considered satisfactory. Actual touch down speed is 65 - 70 MPH. Control during approach and landing is ample. The landing is normal with little tendency for the airplane to bounce. Landing roll is short and directional control can be maintained if brakes are not used excessively. Vision during approach and landing is good.

n. General Functioning

a. Power Plant and Associated Equipment - Engine operation was considered satisfactory except that maintenance was excessive and eventually prompted the decision to abandon the tests. The mixture control on the throttle quadrant seemed to have no effect on engine power. Propeller control was satisfactory and normal in every respect.

b. Hydraulic, Pneumatic, and Electric Systems - With the exception of the complicated operating sequence, the hydraulic system is satisfactory and operated well during the flights. Slow gear retraction was due to low hydraulic pressure. The electrical system functioned without trouble.

c. Emergency Systems - No emergency systems were used, however, the hand hydraulic pump seems to be satisfactory for emergency landing gear operation.

5. Performance

a. Only partial performance tests were completed and the data obtained is listed as follows.

Airspeed Calibration

A satisfactory airspeed calibration over a measured speed course was not obtained. However, the following position correction was calculated by the theodolite method.

TAS MPH (Corr. inst. error)	Position Correction MPH
110	1.5
150	3.4
175	5.3
200	8.3
225	7.2
250	9.7
275	11.2
300	12.6

Level Flight

Included in the following chart is the observed data, corrected for instrument error only, at 5000 feet and 15,000 feet pressure altitudes.

Press. Alt. Ft.	Free Air Temp. °C	RPM	Man. Pr. " Hg.	TAS MPH	Blower
5030	19.5	2700	37.0	301.9	Low
5030	19.5	2500	32.0	279.0	Low
5030	19.5	2200	28.1	256.3	Low
5030	19.5	1900	24.15	219.6	Low
5030	19.5	1600	20.25	174.7	Low
15130	-14.2	2700	37.7	305.2	High
15130	-14.2	2500	32.0	289.9	High
15130	-14.2	2200	28.1	275.9	High
15130	-14.2	1900	24.15	245.2	High
15130	-14.2	1600	20.25	212.2	High

Climb Data

No complete climbs were made with this airplane, however, one partial, or sawtooth climb was obtained at 5000 feet. Results of this sawtooth climb show the best indicated climbing speed to be 135 MPH.

C. Conclusions

1. The Zeke 52 lacks firepower, speed, and pilot protection required for a first class fighter airplane, but surpasses all American types in maneuverability at medium speeds and altitudes.

D. Recommendations

1. None.

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