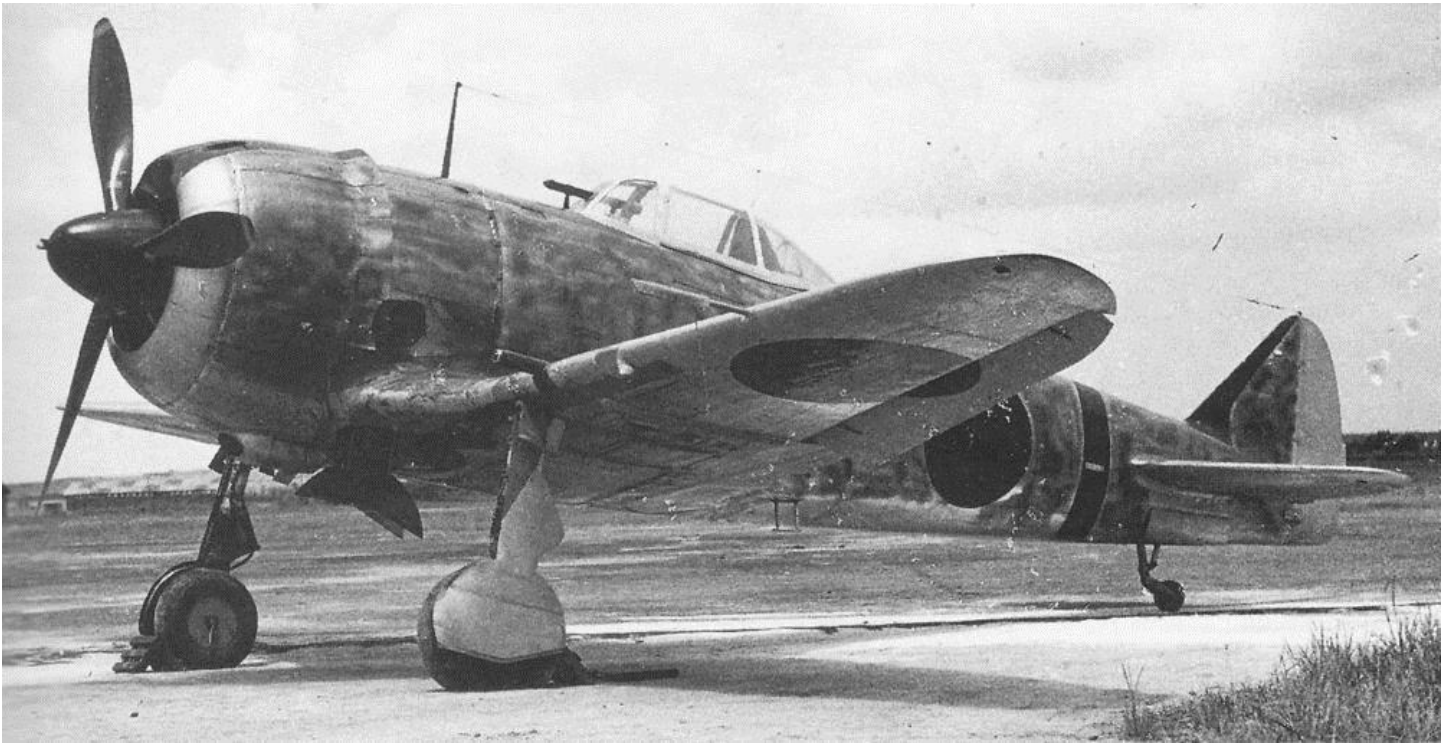


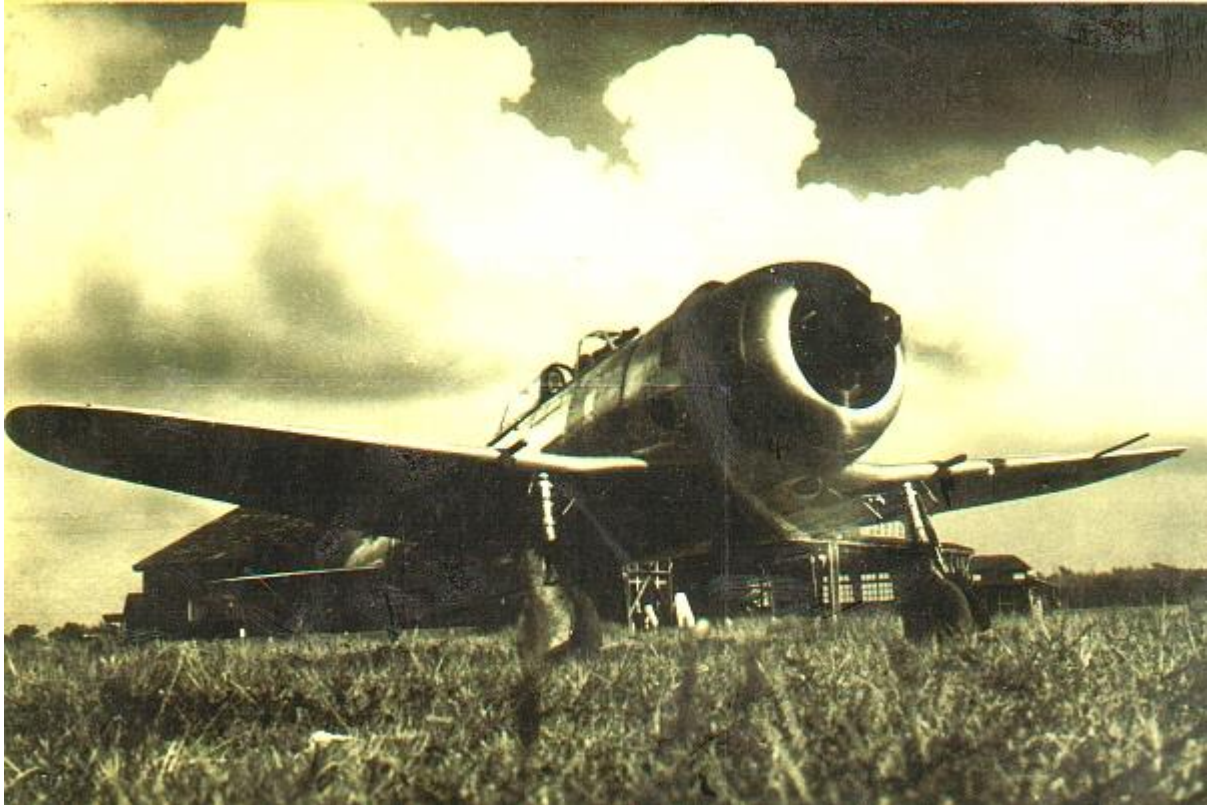
Nakajima Ki-44 Tojo



Durant les années qui précèdent la Seconde Guerre Mondiale, l'industrie aéronautique japonaise se révéla très active, afin notamment de répondre aux nombreuses demandes des forces armées nippones. L'armée de terre, la marine et naturellement l'armée de l'air possédaient leurs propres unités aériennes, et il fallait satisfaire des demandes nombreuses et exigeantes. De nombreux modèles prestigieux naquirent de ces demandes et de cette émulation entre les différents corps des forces japonaises, dont le Ki-44 Shoki. Les autorités militaires japonaises avaient jusque-là mis l'accent sur le développement de chasseurs plutôt légers et maniables, su possible avec une autonomie importante. Mais au début des années 1940, l'avionneur japonais Nakajima reçut de ces autorités une demande portant sur le développement d'un appareil d'interception, à partir d'un de ses produits phares, le Nakajima Ki-43 Hayabusa (code allié : Oscar). Les exigences portaient notamment sur la vitesse ascensionnelle.



Dans ces conditions, la puissance du moteur et la vitesse étaient essentielles, et primaient sur le reste. Nakajima se mit rapidement au travail et à la fin de l'été 1940, le premier prototype était prêts. Ce premier appareil était équipé d'un puissant moteur Nakajima Ha-41 (dérivé du Ha-9 équipant les bombardiers légers Ki-21), de près de 1 250 ch, qui semblait écraser le cockpit sous sa masse. Par rapport au Ki-43, le Ki-44 était plus petit de près d'un mètre, et était mieux armé (2 mitrailleuses de calibre 12,7 mm dans les ailes, plus 2 mitrailleuses de calibre 7,62 mm dans le nez). Testé en vol face au Kawasaki Ki-60 (un prototype qui devait mener au Ki-61 Hien) et à un Messerschmitt Bf-109E, l'appareil se révéla suffisamment intéressant pour qu'une autorisation de production portant sur 40 exemplaires de présérie fut attribuée à Nakajima. Ces premiers exemplaires furent désignés Nakajima Ki-44-la. Il fut commandé sous l'appellation officielle de chasseur monoplace de l'armée Type 2 Modèle 1A Shoki (Démon ou Étouffeur de Dragons), les Alliés les désignant sous le nom Tojo. Ils entrèrent en service à la toute fin de l'année 1941. D'abord déployés en Chine, ils furent par la suite essentiellement engagés sur le territoire métropolitain japonais.



[Nakajima Ki-44 Tojo vu de l'avant](#)

La construction était typique de l'époque, le fuselage et les ailes étant construits en aluminium et les surfaces de commandes étant entoilées. Les Ki-44-la se révélèrent de bons appareils, robustes et surtout rapides. Conçu pour l'interception des bombardiers, ils obligèrent les pilotes nippons à changer de tactique de combat, et à préférer au combat tournoyant les attaques en piqué. Dans ce domaine, ils gênèrent beaucoup les avions alliés. Cependant, les la présentaient un certain nombre de défauts qui rendirent leur utilisation problématique. Leur conception initiale limita sérieusement leur maniabilité, et l'énorme moteur réduisait significativement la visibilité vers l'avant et le bas. En outre, si leur vitesse était très utile au combat, elle rendait plus difficile les atterrissages, qui devaient s'effectuer à une vitesse élevée. Pour remédier à ces défauts, Nakajima lança à la fin de l'année 1942 la production du Ki-44-II. Ce dernier était motorisé par un Ha-109 encore plus puissant, mais conservait le même armement que le Ki-44-Ib. Mieux protégé que le Ki-44-I (les pilotes disposant notamment de réservoirs protégés) et encore plus rapide, le Ki-44-II devint un redoutable adversaire dans les cieux du Pacifique. Progressivement amélioré, essentiellement par l'accroissement de sa puissance de feu, le Shoki causa de nombreux soucis aux pilotes alliés. Dans les dernières années du conflit, l'essentiel des Ki-44 fut basé au Japon, et employé contre les formations de bombardiers lourds états-uniens. Plus rapide et plus stable que les autres chasseurs japonais, les Ki-44 luttèrent avec acharnement jusqu'à la fin. Ils arrivèrent en nombre dans les trois Hikodan (17e, 18e et 19e) du 1er Kokudan qui défendait alors le Japon.

Les effectifs des Hikodan furent augmentés jusqu'à en faire des divisions vers la fin 1944 et les Shoki furent attribués en urgence. Plusieurs Sentai furent équipés de Shoki. L'un des Chutai (section) du 47^e Sentai fut destiné à des attaques-suicides d'éperonnage sur des B-29. Les Shoki furent aussi utilisés en chasse de nuit, dans le cadre de la technique d'origine allemande de la Wilde Sau (trouie sauvage), qui consistait à engager des monoplaces de chasse diurne de nuit, chaque fois que la clarté de la lune était suffisante. Malgré les qualités du Shoki, cette tâche devint de plus en plus difficile, avec le renforcement de la puissance de feu des bombardiers, et de leur escorte. La production du Ki-44 cessa au tout début de l'année 1945, au profit du nouveau Nakajima Ki-84 Hayate. On estime la production totale à environ 1 225 exemplaires, ayant tous servi au sein des unités aériennes dépendant de l'armée de terre impériale japonaise. Quelques exemplaires survécurent à la fin de la guerre, au sein des forces aériennes chinoises (communiste et nationaliste), et en Indonésie.

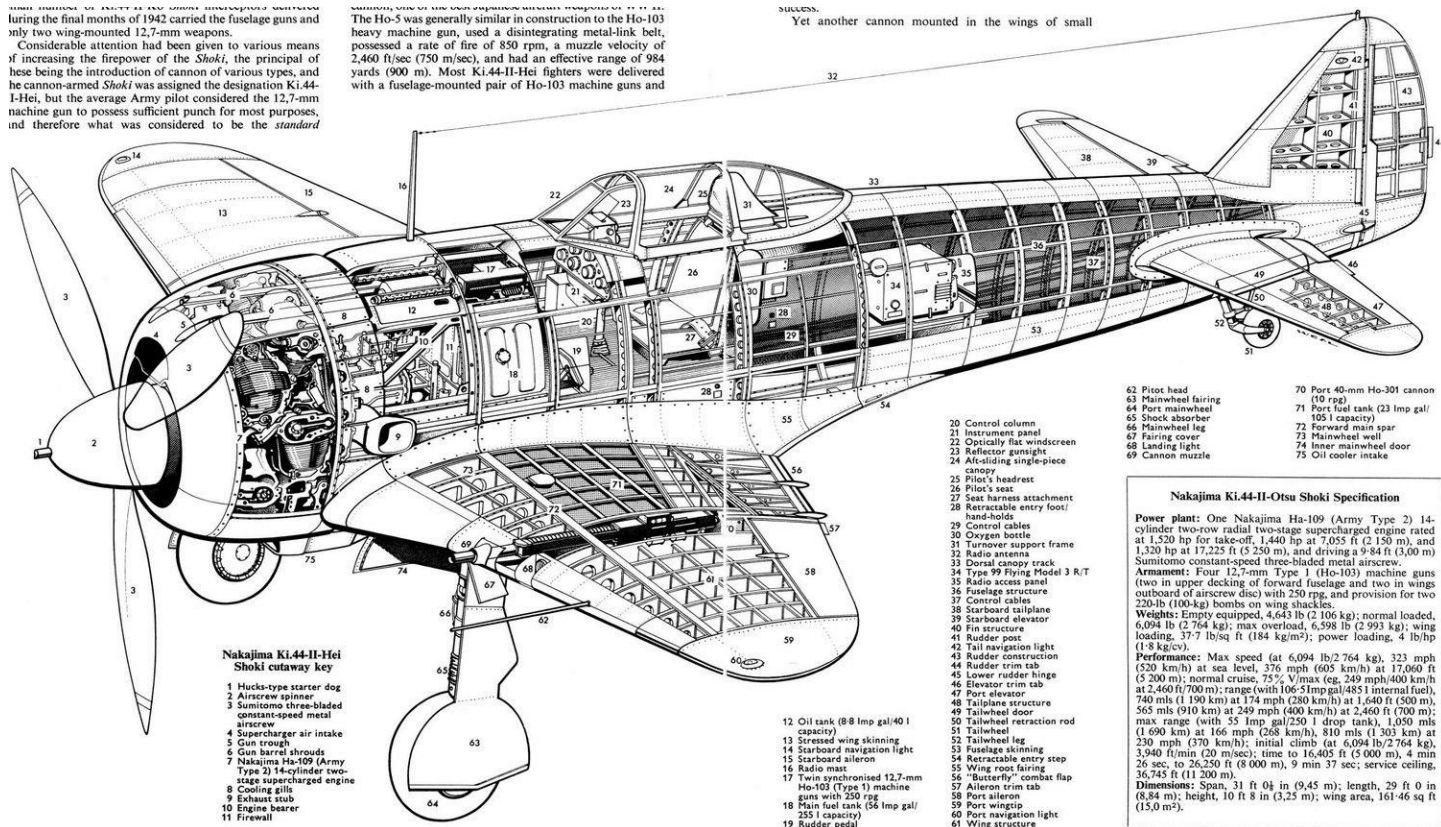
... during the final months of 1942 carried the fuselage guns and only two wing-mounted 12.7-mm weapons.

Considerable attention had been given to various means of increasing the firepower of the *Shoki*, the principal of these being the introduction of cannon of various types, and the cannon-armed *Shoki* was assigned the designation Ki-44-I-Hei, but the average Army pilot considered the 12.7-mm machine gun to possess sufficient punch for most purposes, and therefore what was considered to be the *standard*

The Ho-5 was generally similar in construction to the Ho-103 heavy machine gun, used a disintegrating metal-link belt, possessed a rate of fire of 850 rpm, a muzzle velocity of 2,460 ft/sec (750 m/sec), and had an effective range of 984 yards (900 m). Most Ki-44-I-Hei fighters were delivered with a fuselage-mounted pair of Ho-103 machine guns and

success.

Yet another cannon mounted in the wings of small



Nakajima Ki-44-II-Otsu Shoki Specification

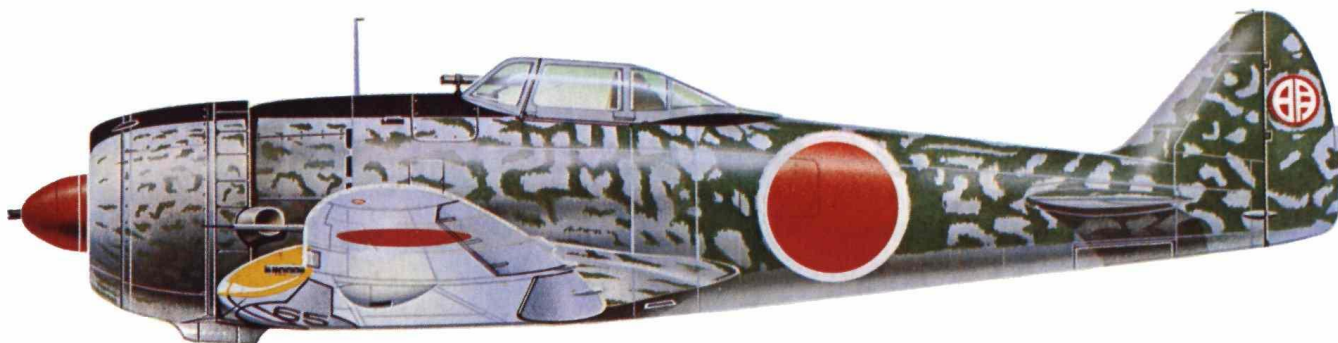
Power plant: One Nakajima Ha-109 (Army Type 2) 14-cylinder two-row radial two-stage supercharged engine rated at 1,520 hp for take-off, 1,440 hp at 7,055 ft (2,150 m), and 1,320 hp at 17,225 ft (5,250 m), and driving a 9.84 ft (3.00 m) Sumitomo constant-speed three-bladed metal airscrew.

Armament: Four 12.7-mm Type 1 (Ho-103) machine guns (two in upper decking of forward fuselage and two in wings outboard of airscrew disc) with 250 rpg, and provision for two 220-lb (100-kg) bombs on wing shackles.

Weights: Empty equipped, 4,643 lb (2,106 kg); normal loaded, 6,094 lb (2,764 kg); max overload, 6,598 lb (2,993 kg); wing loading, 37.7 lb/sq ft (184 kg/m²); power loading, 4 lb/hp (1.8 kg/kv).

Performance: Max speed (at 6,094 lb/2,764 kg), 323 mph (520 km/h) at sea level, 276 mph (405 km/h) at 17,060 ft (5,200 m); normal cruise, 75%; V max (eg, 249 mph/400 km/h at 2,460 ft/700 m); range (with 106.5 Imp gal/485 l internal fuel), 740 mi (1,190 km) at 174 mph (280 km/h) at 1,640 ft (500 m), 565 mi (910 km) at 249 mph (400 km/h) at 2,460 ft (700 m); max range (with 55 Imp gal/250 l drop tank), 1,050 mi (1,690 km) at 166 mph (268 km/h), 810 mi (1,302 km) at 230 mph (370 km/h); initial climb (at 6,094 lb/2,764 kg), 3,940 ft/min (20 m/sec); time to 16,405 ft (5,000 m), 4 min 26 sec, to 26,250 ft (8,000 m), 9 min 37 sec; service ceiling, 36,745 ft (11,200 m).

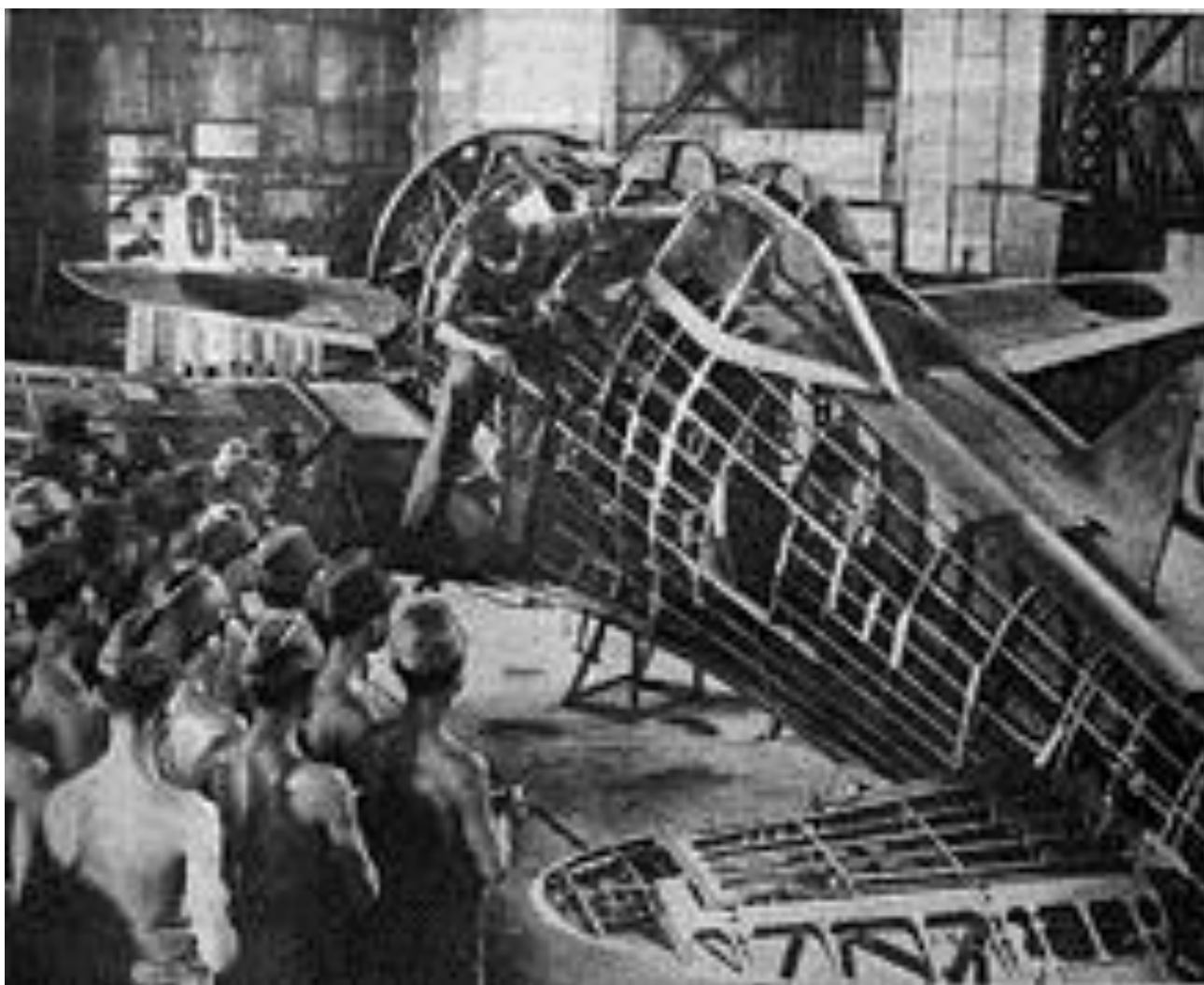
Dimensions: Span, 31 ft 0 in (9.45 m); length, 29 ft 0 in (8.84 m); height, 10 ft 8 in (3.25 m); wing area, 161.46 sq ft (15.0 m²).



Source : <https://aviationsmilitaires.net/v3/kb/aircraft/show/89/nakajima-ki-44-tojo>

The **Nakajima Ki-44 Shoki** (鍾馗, "[Devil Queller](#)")^[2] was a single-seat [fighter-interceptor](#) which was developed by the [Nakajima Aircraft Company](#) and operated by the [Imperial Japanese Army](#) from 1942 to 1945 during [World War II](#). Its official designation was **Army Type 2 Single-Seat Fighter** (二式単座戦闘機) and its [Allied reporting name](#) was **Tojo**. The design and development of the Ki-44 differed greatly from that of other Japanese fighters of the time, incorporating speed and [rate-of-climb](#) in preference to maneuverability.^[3] This was a result of a need for a [heavy fighter](#) aircraft that followed a more offensive doctrine and the Ki-44 is often classified as an Air Defence Fighter.^{[3][4]} Its development ran almost in parallel to its predecessor, the lighter and nimbler [Nakajima Ki-43](#), and yet the two aircraft differed. The Ki-44 had a higher landing speed but was less maneuverable. These were concerns for pilots who would compare it to the Ki-43 or [Ki-27](#) which were far more agile and responsive. As a result, the Ki-44 was first restricted to pilots with at least 1000 hours of flying time due to its tricky handling characteristics. However, it was later found that younger pilots who had not been instilled with the extensive aerobatic training of earlier cadres could manage the aircraft perfectly well, so the restriction was removed.^[3] Nonetheless, the Ki-44 was the fastest climbing Japanese fighter at the time. It was the Imperial Japanese Army's only interceptor type when the USAAF's [B-29 Superfortresses](#) began bombing the Japanese mainland in June 1944.^{[3][5]} While there were performance restrictions at high altitude, it was superior to the Ki-43 in that it was capable of matching Allied aircraft in climbs and dives, giving pilots more flexibility in combat and greater pilot confidence than the Ki-43; the basic armament of four 12.7mm machine guns or two 12.7mm guns and two 20 mm cannons (or, in a few aircraft, two [Ho-301 40mm cannons](#) of limited range) was far more powerful than the older Ki-43's two 12.7mm machine guns.^{[6][7]} Production of the Ki-44 was terminated in late 1944 in favour of the more advanced [Nakajima Ki-84](#), and when the war ended, only three [sentai](#) units were still equipped with them.^[8] No examples survive today.

Design and development



A Ki-44 at the Tokorozawa Army Maintenance School.

Nakajima began development of the Ki-44 in 1940 as a pure [interceptor](#) with emphasis being placed on airspeed and rate of climb rather than maneuverability, a departure from the usual Japanese standards.^[9] The Japanese Army Air Force specification called for a maximum speed of 600 km/h (370 mph) at 4,000 m (13,130 ft), to be attained in five minutes. A set of Ki-43-like "butterfly" combat [flaps](#) was fitted for improved maneuverability. Armament consisted of a pair of 7.7 mm (.303 in) and a pair of 12.7 mm (.50 in) [machine guns](#). The engine selected for the new interceptor was Nakajima's Ha-41 (a development of the [Nakajima Ha-5](#)) 14-cylinder double-row [radial](#), originally intended for bomber aircraft. Although the Ha-41 was not the ideal choice due to its large-diameter cross section, the design team was able to marry this engine to a much smaller fuselage with a narrow cross section. At 1,260 mm in diameter, the Ha-41 was 126 mm larger in diameter than the 1,144 mm [Nakajima Sakae](#) (used in the [Mitsubishi A6M](#) "Zero" and [Nakajima Ki-43](#) "Hayabusa"). However, the Sakae was only 27.8L in displacement and 1,000 hp, while the Ha-41 was 37.5L and made 1,260 hp (1,440 in the later Ha-109 version). In any case, since the Sakae wasn't powerful enough, the only alternative available was the Mitsubishi Kinsei, which was slightly smaller than the Ha-41 in diameter, five liters smaller in displacement, and was less powerful. Unfortunately, this was already in demand for many other aircraft, so the Ha-41 was chosen as the best powerplant. In order to achieve its design goals, the wing area was relatively small leading to a high [wing loading](#) and a comparatively high landing speed that could be daunting to the average Japanese pilot, who was more used to aircraft with a low wing loading like the Ki-44's predecessors, the Ki-43 and [Ki-27](#). With an all-metal structure, the Ki-44 was metal-skinned except for the control surfaces, which were fabric covered. Relatively small wings gave the aircraft a high wing loading and consequently a high landing speed, which many pilots disliked.^[10] The first Ki-44 [prototype](#) flew in August 1940 and the initial test flights were generally encouraging, with handling considered acceptable considering the high wing loading. Problems encountered included a high landing speed and poor forward visibility during taxiing due to the large radial engine. A second pre-production batch of 40 aircraft were ordered, which featured four 12.7mm machine guns, a relocated air cooler and main gear doors.^[11]

Operational history

The Nakajima Ki-44 at one point equipped 12 [sentai](#) ("[groups/wings](#)") of the Imperial Japanese Army Air Force: 9, 22, 23, 29, 47, 59, 64, 70, 85, 87, 104 and 246 *Sentai*. The [Manchukuo Air Force](#) also operated some Ki-44s.



Captured Ki-44

Pre-production Ki-44 aircraft and two of the prototypes were turned over to the Army for service trials on 15 September 1941. The type commenced operations when nine aircraft were received by an experimental unit, *47th Chutai "Kawasemi Buntai"* ("Kingfisher [Flight](#), 47th Squadron"), commanded by Major Toshio Sakagawa at [Saigon](#), Indochina in December 1941. The Ki-44 also saw significant action with *87th Sentai* in the air defense role, while based at [Palembang](#), [Sumatra](#). Other units equipped with the Ki-44 during the early part of the war were stationed in [China](#), [Burma](#), the [Philippines](#) and [Korea](#).



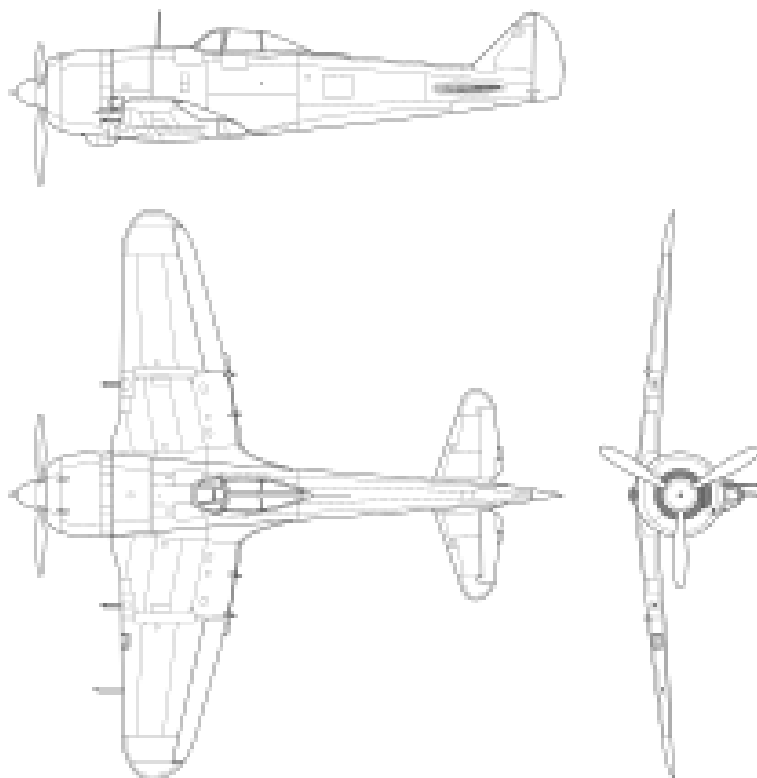
A Japanese Ki-44.

Later in the war, the type saw action in an air defense role over the home islands – mainly around Japan's large industrial cities. *47 Chutai*, after it was transferred to air defense roles in Japan, was expanded to become *47 Sentai*. The Ki-44-II *Otsu* (also known as the Ki-44-IIb) could be armed with a [Ho-301](#) 40 mm autocannon. While this was a relatively high-caliber weapon, it used [caseless ammunition](#) with a low [muzzle velocity](#) and short range, which was effective only in close attacks. Some of these aircraft were used against USAAF bombers by a special *Shinten Seiku Tai* ([air superiority](#) unit), comprising at least four aircraft,^[12] that was part of *47th Sentai*, based at [Narimasu](#) airfield in Tokyo. Pilots from such units attempted to shoot down B-29s and, once their ammunition was expended, to [ram](#) them – effectively a suicide attack. While the concept appeared straightforward, ramming a B-29 at high altitudes was difficult to achieve in practice. By the end of the war, Ki-44 variants were being replaced by the [Nakajima Ki-84 Hayate](#), which was regarded as vastly superior – in aspects other than maintenance and reliability. During 1946–49, both sides in the [Chinese Revolution](#) operated Ki-44s surrendered or abandoned by Japanese units. Air units of the [People's Liberation Army](#) obtained aircraft formerly belonging to 22 and 85 *Sentai*, which had disbanded in [Chosen](#). Some of these aircraft were reportedly flown by Japanese veterans. Within the [Republic of China Air Force](#) 18th Squadron (12th Fighter Group) was equipped with Ki-44s formerly of *9th Sentai*, which had disbanded in Nanking, and *29th Sentai*, which had disbanded at [Formosa](#) and they saw action in ^[12] Following the retreat of the Nationalists the [People's Liberation Army Air Force](#) (formed in 1949) used the Ki-44 until the early 1950s.

Surviving aircraft

No complete surviving examples of the Ki-44 exist today. However, a wing center section is preserved at the [Northwestern Polytechnical University](#) Aviation Museum, at [Xi'an](#) in China.

Specifications (Ki-44-II Otsu)



General characteristics

- **Crew:** One
- **Length:** 8.84 m (29 ft 0 in)
- **Wingspan:** 9.45 m (31 ft 0 in)
- **Height:** 3.25 m (10 ft 8 in)
- **Wing area:** 15 m² (160 sq ft)
- **Airfoil:** root: NN-2 mod. (14.8%); tip: NN-2 mod. (9%)^[18]-->
- **Empty weight:** 2,106 kg (4,643 lb)
- **Gross weight:** 2,764 kg (6,094 lb)
- **Max takeoff weight:** 2,993 kg (6,598 lb)
- **Powerplant:** 1 × [Nakajima Ha-109](#) (*Army Type 2 1,450hp Air Cooled Radial* / unified - Nakajima Ha-34) 14-cylinder air-cooled radial piston engine, 1,133 kW (1,519 hp) for take-off
1,070 kW (1,440 hp) at 2,150 m (7,050 ft)
980 kW (1,320 hp) at 5,250 m (17,220 ft)
- **Propellers:** 3-bladed constant-speed metal propeller

Performance

- **Maximum speed:** 605 km/h (376 mph, 327 kn) at 5,200 m (17,100 ft)
- **Cruise speed:** 400 km/h (250 mph, 220 kn) at 4,000 m (13,000 ft)
- **Stall speed:** 150 km/h (93 mph, 81 kn)
- **Range:** 1,200 km (750 mi, 650 nmi)
- **Ferry range:** 1,600 km (990 mi, 860 nmi)
- **Service ceiling:** 11,200 m (36,700 ft)
- **Time to altitude:** 5,000 m (16,404 ft) in 4 minutes 17 seconds
- **Wing loading:** 184 kg/m² (38 lb/sq ft)
- **Power/mass:** 0.38 kW/kg (0.23 hp/lb)

Armament

- **Guns:** 2x fixed, forward-firing, synchronised 12.7 mm (0.500 in) [Ho-103 machine guns](#) + 2x wing mounted 12.7 mm (0.500 in) [Ho-103 machine guns](#)

Optional provision for two 40 mm (1.575 in) [Ho-301 cannon](#) in the wings, firing [caseless ammunition](#).

- **Hardpoints:** 2 with a capacity of 2x 130 L (34 US gal; 29 imp gal) drop tanks

Source : https://en.wikipedia.org/wiki/Nakajima_Ki-44