

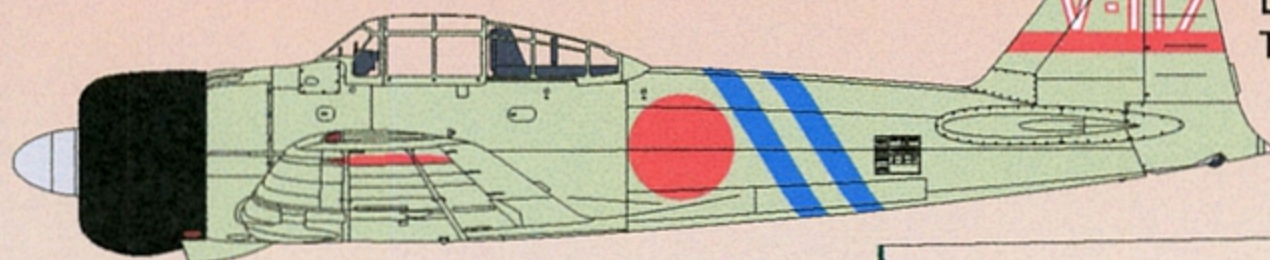
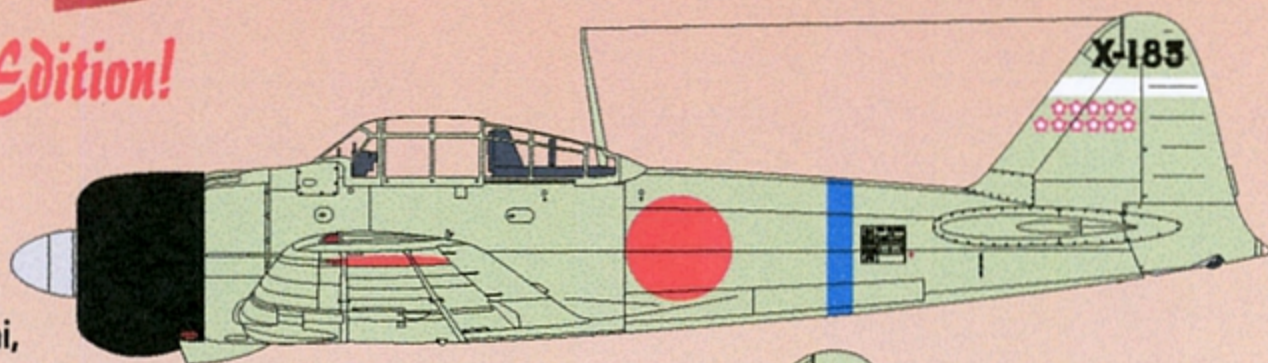
**Lifelike Decals**

**48-062**

# Mitsubishi A6M Zero Fighters Part 2

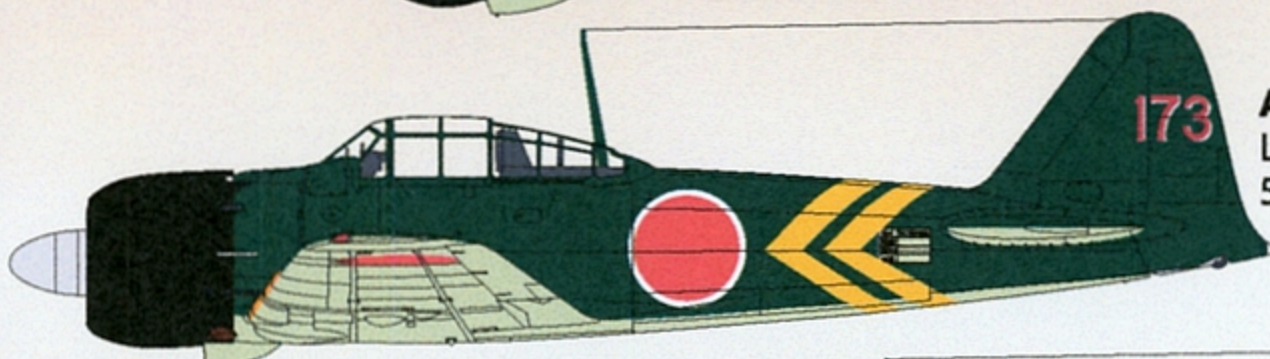
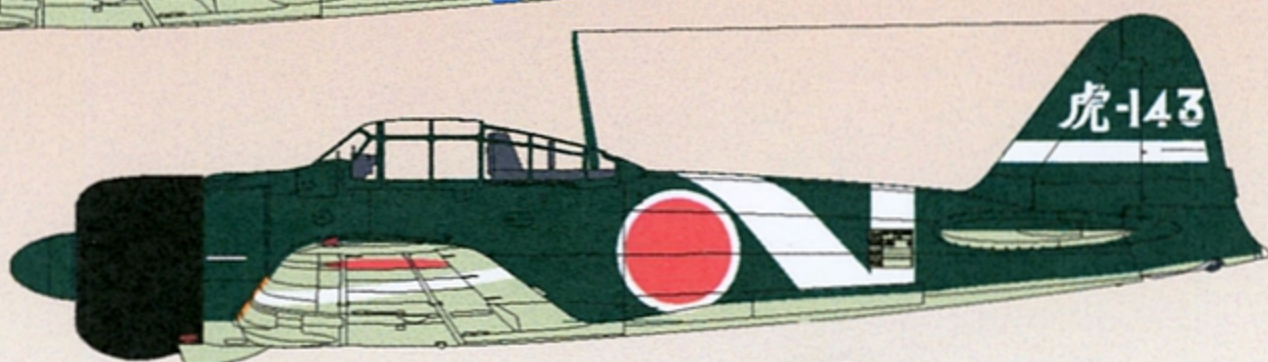
*Limited Edition!*

**A/C #1 (Type 21)**  
PO 2/C Hashiguchi,  
3rd Kokutai



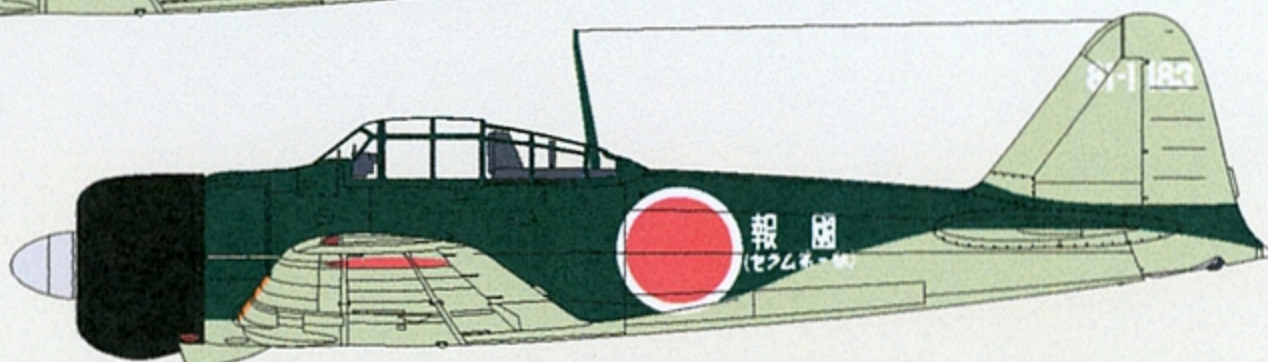
**A/C #2 (Type 21)**  
Lt. Seto,  
Tainan Kokutai

**A/C #5 (Type 21)**  
261st Kokutai



**A/C #8 (Type 22 Kou)**  
Lt. Com. Shindo,  
582nd Kokutai

**A/C #9 (Type 21)**  
381st Kokutai



*A total 13 markings are featured herein.*

Recommended kits: Type 21 & A6M2-N: Eduard, Hasegawa or Tamiya  
Type 22: Eduard or Tamiya  
A6M2-K: Hasegawa (OOP)

Lifelike Decals wants to hear from you and your input.

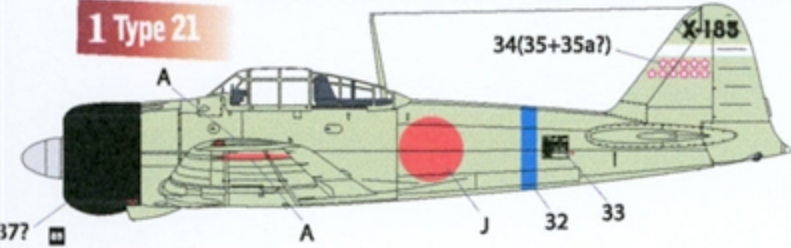
e-mail: [llifelike\\_d@kcn.jp](mailto:llifelike_d@kcn.jp)

<http://lifelikedecals.sakura.ne.jp>

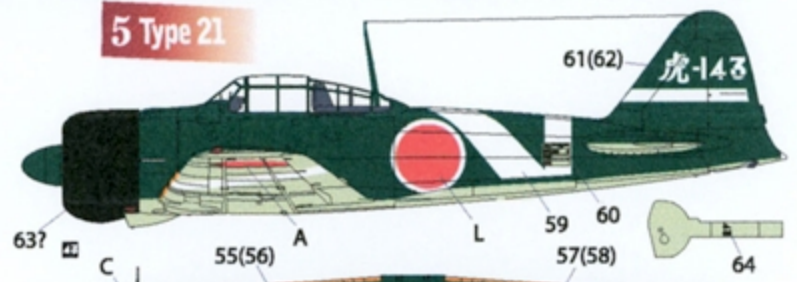


# Lifelike decals 48-062 Mitsubishi A6M Zero Fighters Part 2

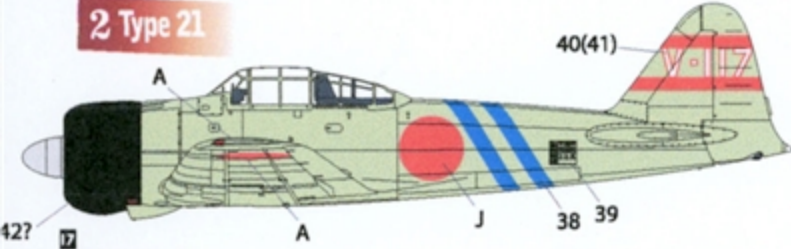
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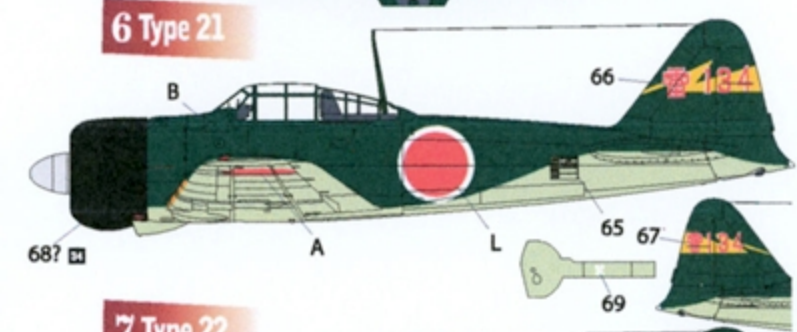
5 Type 21



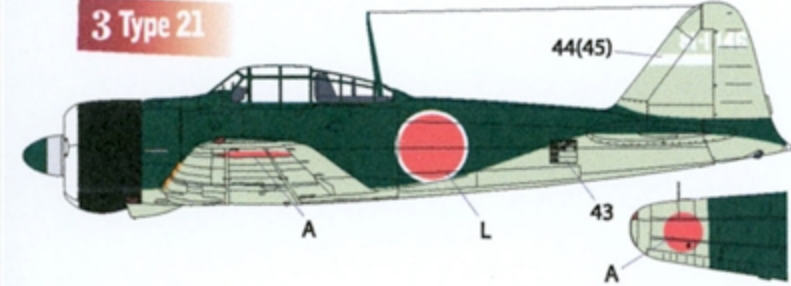
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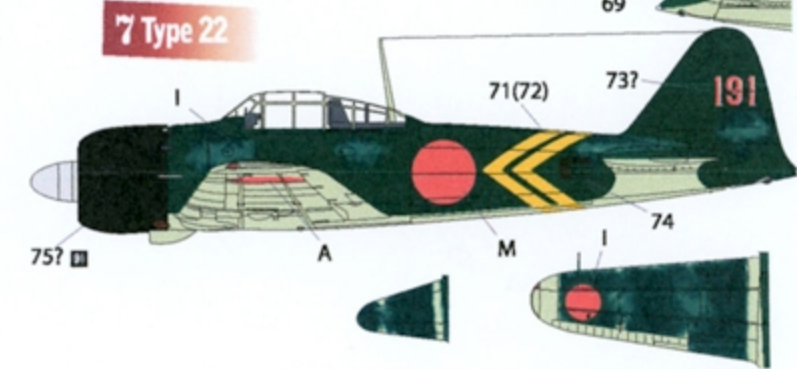
6 Type 21



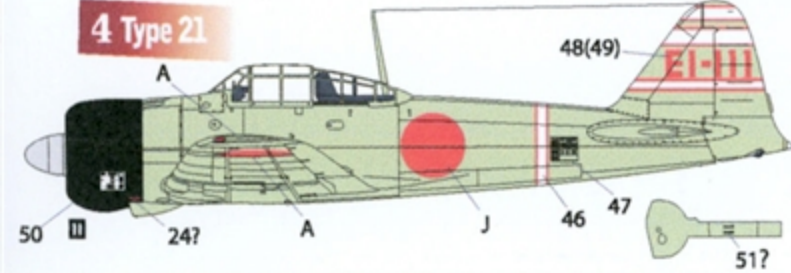
3 Type 21



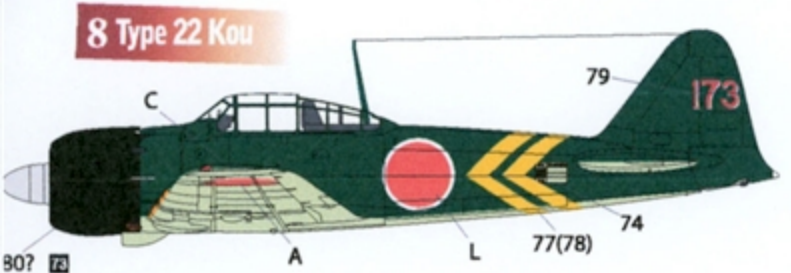
7 Type 22



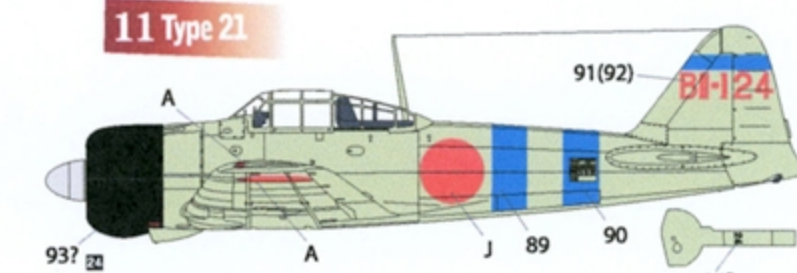
4 Type 21



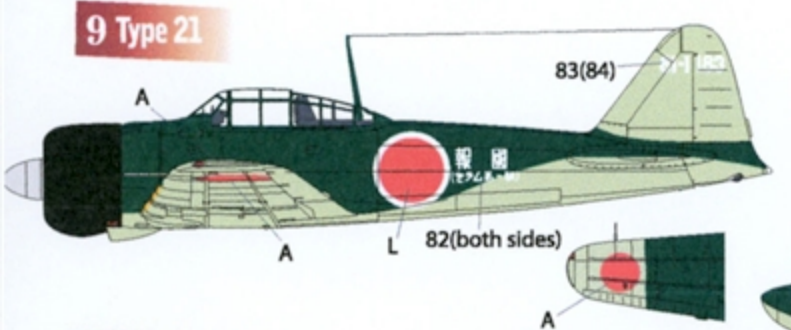
8 Type 22 Kou



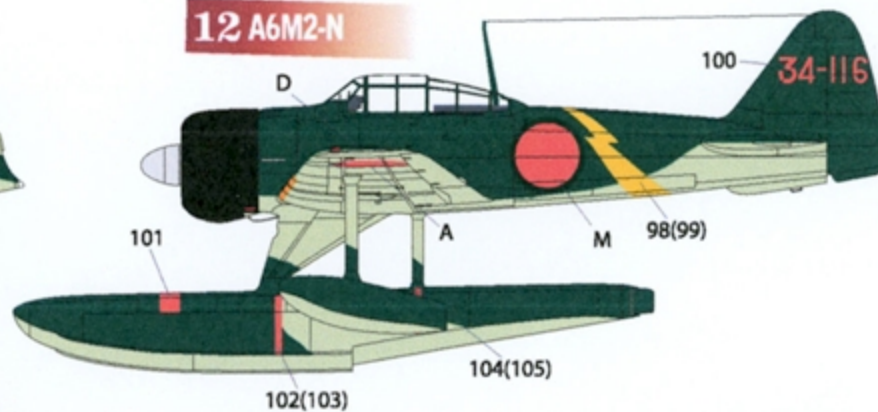
11 Type 21



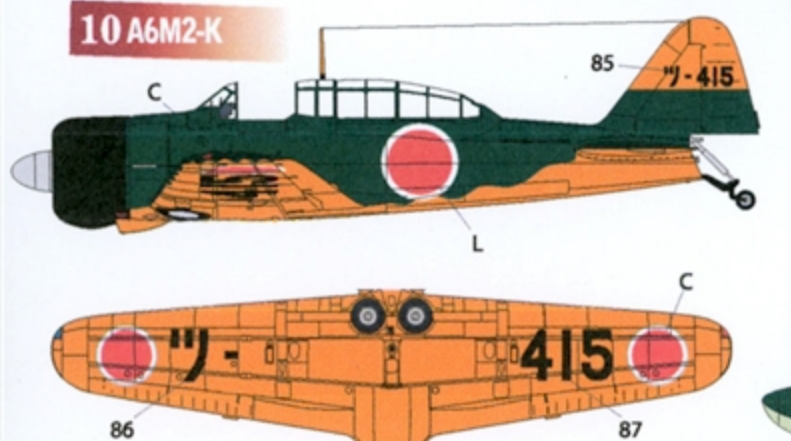
9 Type 21



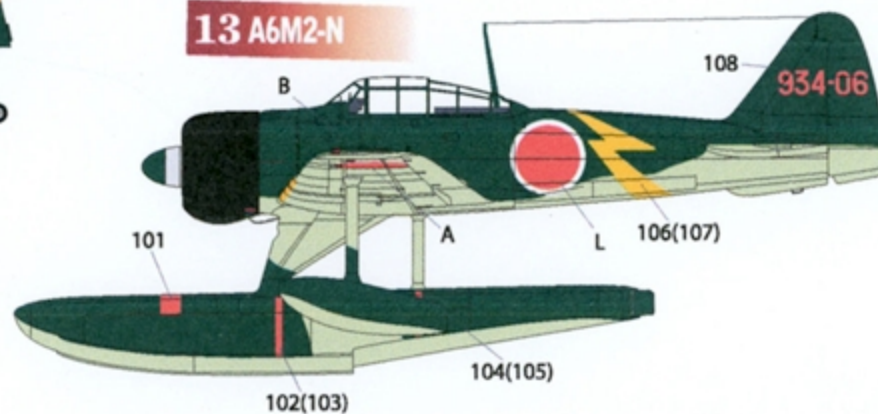
12 A6M2-N



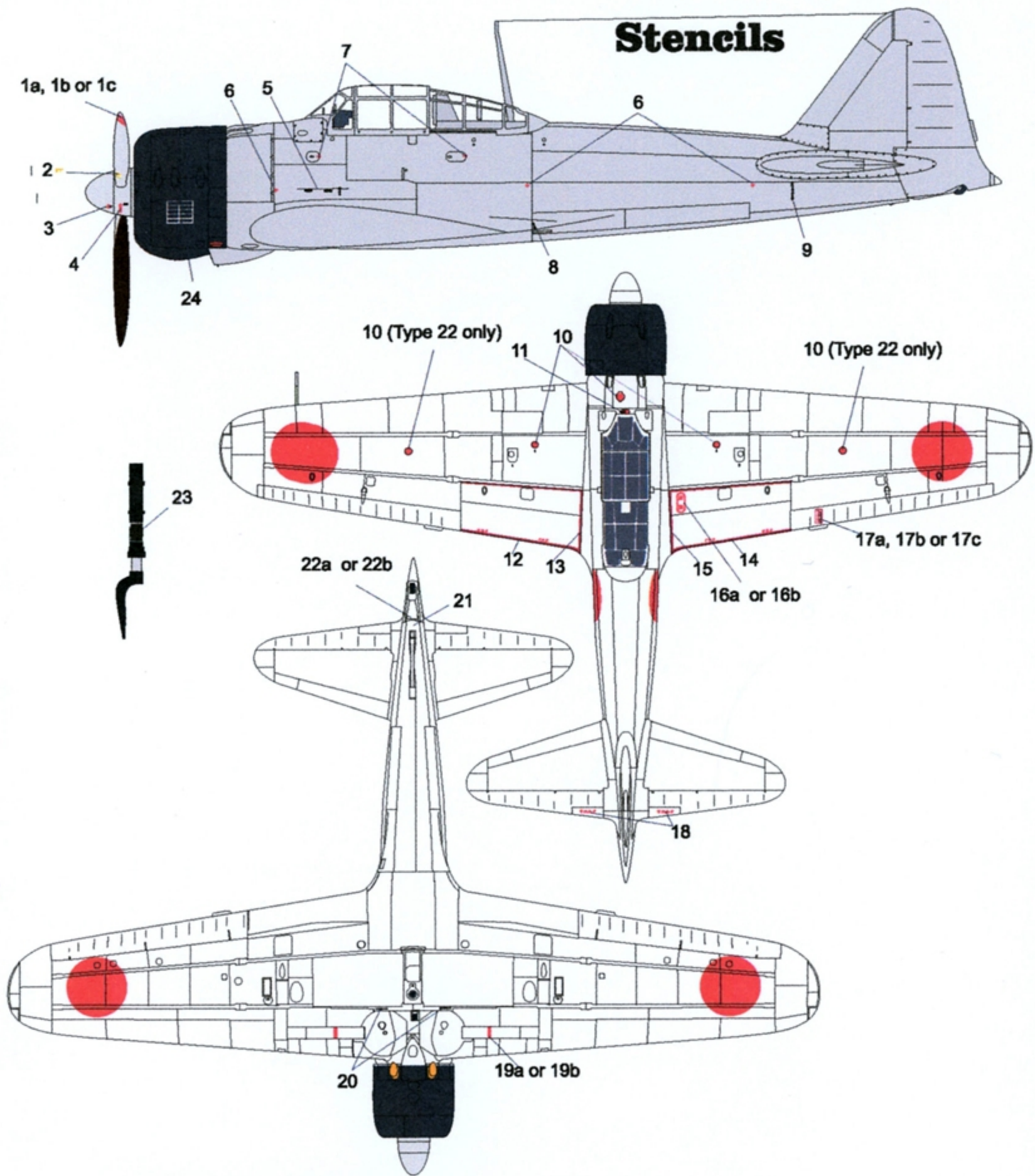
10 A6M2-K



13 A6M2-N







## Acknowledgments

Special thanks to Mr. Nick Millman and Mr. Mitsuo Ashimoto for various information and research. We highly respect the pioneering work of Director Sunao Katabuchi, who has published valuable information on Zero color and paints in recent magazines and book. We pray for the souls of Mr. James Lansdale and Mr. Henry Sakaida, who released many books on Japanese Army and Navy Aviation, and passed away in 2018. Finally we thank Mr. Nick Millman for the check of English captions.



## Caption for 48-062, Zero Fighter part 2

### (General Notes)

#### (1) Camouflage colors of Zero Fighters

In the early days Japanese Navy planes were painted in silver dope overall, but with rising tide of war on November 26<sup>th</sup>, 1938 (further amended on April 10<sup>th</sup>, 1942) Imperial Navy established "Kariki (provisional regulation) 117" for the colors to be used for aircraft and showed color samples in a separate booklet. This provisional regulation was to be formally regulated as "Chi-xxx" later, but this provisional regulation lasted a long time until "Kouku Kikaku (Aircraft Specification) 8609" (KouKaku 8609) was issued on February 5<sup>th</sup>, 1945 to unify the colors of Japanese Army and Navy aircrafts. (This Directive was issued only six months before the end of the war, and it is not known how strictly it was followed in the production line.

Currently only two sets of Kariki 117 (amended version) are known to exist, one at Nihon Tokushu Toryo Co. Ltd. (non-public) and another in Japan National Diet Library. The latter has shown Kariki 117 to the public before, but currently only its photo is available to prevent precious Kariki 117 from damage (intentionally or unintentionally).

It is not known how the seller obtained it, but Kariki 117 was once sold at high price in Yahoo Auction;

(<https://aucview.com/yahoo/178274572/>).

Kariki 117 only specifies the color of the 54 colors approved but does not indicate how the colors should be used (although this is sometimes stated in other directives) or specify any pigment composition. Probably not all 54 colors were used indeed.

Their color samples are shown on the internet at (<https://plaza.rakuten.co.jp/zerosenochibo/diary/?ctgy=30>) and in some books/magazines, but how precisely they are reproduced is questionable. Mr. Isami Akiyama's article in [ref. A](#) shows pictures of some representative color samples of Kariki 117 used for the Zero fighter (like Grey J3, Green D2, Red B2 or Yellow C1, C2) with FS color samples or QP cards in one frame, and clearly shows what those color samples look like. (This article also shows some 10 colors of Koukaku 8609 in the same comparison way, but as it is printed, the colors of standard samples are sometimes distorted from the real standard color samples.) But it should be noted that they only show original color, and how the real paints (composed of many ingredients) changed its color upon oxidation, heat and exposure to UV.

#### (2) Grey J3 and "Ameiro"

It is known that Zero Fighters were painted in Grey J3 overall (see below). Its color sample in Kariki 117 is dark grey, just one step darker than FS26307, but painting the same color on Zero Fighter models make them appear very dark. But b/w photos of early Zeros and color photo of recovered Zero, Houkoku-515, in [ref. B~D](#) clearly show camouflage paint is much lighter (lighter than Hinomaru red!). Thus, in painting Zero models the camouflage color should be a much lighter grey.

The Imperial Navy published report #0266 in February 1942, which studied what camouflage color is best for Zero Fighter. In this report they commented that "camouflage color of benchmark Zeros (from Yokosuka Kokutai, Yo-102, 108, 110 and 112) is different from (fresh) J3 color, as it is **faintly** tinted with Ameiro (candy color) with glossy finish". As the color of benchmark Zero was distorted from J3, they repainted "Yo-105" with fresh J3 paint. This report clearly shows that Grey J3 paint was applied on Zero Fighters, and benchmark Zero (some time from production line) wore faint brown color. But this Ameiro phrase was provisionally used ONLY in this report, and it is not found in any other documents. (Similarly, 2 provisional names for green color are used in this document, and never found in official documents.) (Ref. P)

One Japanese researcher adopted this "Ameiro" phrase and alleged that J3 color is "Ameiro", citing the solid brown color of recovered Zero paint chips (after degradation of more than 50 years) as evidence. It was published in many



books and magazines before and is now rather widely accepted, but this is completely in error. If J3 is such solid brown color, there is no significant brightness difference against Hinomaru red, and Hinomaru should have white outline to make it stand out, like the case of Zero trainer with orange-yellow camouflage. "Ameiro" color did NOT exist as official color at all. Such solid brown color is the result of degradation for more than 50 years. It is more appropriate to think that J3 paint wore just faint brown color during a few years of conflict.

Thanks to the long-time research of Director Sunao Katabuchi, the formula of J3 paint was found in the book written by Mr. Tsuruo Araki who was the research director of Aichi Tokei Denki Co. Ltd. (manufacturer of type 99 Carrier Bomber). This company once tried to produce J3 paint by themselves but was ordered to concentrate on aircraft production by Imperial Navy. (Production of paint was consolidated to Nihon Tokushu Toryo, but their formula is not published.)

This formula is now published in ref. B and E. According to this formula, the paint was composed of 5 organic solvent, Zinc Oxide (white pigment), carbon black (black pigment), tricresyl phosphate (flame retardant), low viscosity benzyl cellulose, Ablator K6S and T.C. resin (all for paint film) among others. (Mr. Millman informed us that anatase form of Titanium Dioxide was detected as white pigment in the analysis of paint chips from Lt. Iida's and PO 1/C Nishikaichi's Zero which fell into US hands at Pearl Harbor Attack. Thus, Nihon Tokushu Toryo probably used Titanium Dioxide instead of Zinc Oxide. He also informed us that paint chips from Lt. Iida's Zero and Zero recovered from Midway Battle were analyzed by Hawaii University team and detected Urushi-type resin binder.) Tricresyl phosphate is slightly yellow. Mr. Nicholas Millman suggested "Ablator" may be "Albanol" which is nitro cellulose and Luftwaffe also used as paint ingredient. If so, this ingredient is also slightly yellow. Benzyl cellulose is colorless in a high purity state (like reagent grade), but commercially produced material contains small amounts of impurities (benzyl chloride, benzyl alcohol, benzaldehyde etc.), and tends to wear yellow to brown color upon degradation (light, oxygen, and heat) due to benzyl residue. More significant finding by Director Katabuchi is that Imperial Navy used carbon black made of soot dust from incinerating anthracene oil of coal tar, which yields pale blue pigment into water and organic solvent (ref. F). In the interview article of Mr. Hitoshi Yoshimura with former Zero test pilot Mr. Seiichi Maki in Model Art 1983 March issue, Mr. Maki said Designer Horikoshi told him that first/second Zero prototype were painted in "light greenish grey" (probably M2 paint used for underlayer of metallic surface painting), third/fourth prototype in "light blue grey" (probably J3 grey with blue tint exuding from carbon black), and fifth/sixth prototype in NMF. (ref. G). Former Rabaul fighter pilot testified that grey J3 color is "light grey with blue tint" (ref. H). In the formula list of J3 grey shown in ref. B or E carbon black is just 0.16% of paint ingredient (excluding organic solvents), but if Titanium Dioxide (with stronger coating ability than Zinc Oxide) it is highly probable that more carbon black was used to adjust Kariki 117 color sample. The blue color exuding from carbon black makes J3 grey look slightly bluish grey initially, and when more yellow color come from degradation of benzyl cellulose, J3 grey becomes slightly greenish grey. For example, US Investigation report on PO 1/C Yoshimitsu Koga's Zero, DI-108 that force-landed on Akutan Island in 1941 says "outer surface is very smooth, and its color is greenish light grey with blue tint. The Investigation report on PO 3/C Yoshimitsu Maeda, V-110, that force-landed in Port Moresby in 1942 says "top surface is light grey, but when we remove it on rudder, we recognized a greenish color that we call Sky (= Duck Egg Green) (ref. I). Several pilots and solid modelers in the war-time period said Zero color is "Aotatami Iro" (fresh straw mat color with green color), "Wakakusa Iro" (live grass color with green) and "Uguisu Iro" (most of Japanese people remind Japanese white-eye which is green) (ref. J).

Another interesting fact is that in the list of KouKaku 8609 (ref. A) new Grey color 2-6 was listed as common camouflage paint for both Imperial Army and Navy aircraft, and Navy J3 color is listed as standard and Army No. 1 Grey Green color (grey with distinct green tint) as close match.

In 2022 further decisive evidence of J3 color are shown by Director Katabuchi and Mr. Taizo Nakamura in ref. B~D. These references show color photos of Zero type 21 (Mitsubishi No. 2666), "Houkoku-515, 広島県産報呉支部號



(donated by Kure branch of Hiroshima Workers Unions), which (with the fund raised by Director Katabuchi) was recovered from the jungle of Guadalcanal Island, brought back to Japan, and now displayed in a private museum of Mr. Nakamura in Matsudo. This aircraft was shot down (which unit and pilot unknown) over Guadalcanal, exploded in the air, and rear fuselage fell sideways into jungle. Left fuselage sides were on upper side and exposed to rain/wind/UV and only remnant of anti-rust paint remains, but right-side fuselage was on lower side, and much less exposed to rain/wind/UV and original color J3 is relatively well preserved. The inner side of tail fillet shows original J3 color, while broken fillet area shows faintly brown color. The color inside fillet is grey with little green tint which is in good agreement with above observation. A microscopic view of its fallen paint chip (cut vertically) shows top area is grey J3 with slight chalking and under it a thick layer of J3 in yellow ocher, and no varnish layer was found (ref. K). (Detailed research by Mr. James Lansdale reveals that there is NO Navy or factory document to paint varnish on the top surface.)

Australian Aviation Heritage Centre in Darwin/Australia keeps remnant wing of BII-123 (flown by NAP 1/C Hajime Toyoshima of Hiryu Fighter Group, LLD 48-062 A/C#11) on the wall. Lower wing was kept away from direct sunlight, and green tint of J3 color is relatively well preserved but still more yellowing than Houkoku-515 (ref. L).

Wing panel of Zero, BI-151 (probably) flown by Lt. Fusata Iida/Sohryu Fighter Group (48-061, a/c #11) is kept in one Japanese museum, and its photo is shown in ref. M. Color photo of Zero panel from Mitsubishi #4316 was once shown on e-Bay. Colors of these are solid green with little brown color, which is probably the result of long-time degradation, but these observations clearly indicate J3 paint becomes slightly bluish first, then with increasing yellow color coming from benzyl cellulose has tendency to wear green and brown tint. But due to chalking and removal of top surface (see below) yellow or brown coloring should have been minimal during a few years of Zero's active service.

### **(3) Further aging variation of J3 paint**

From the research of Director Katabuchi (ref. K) and Mr. Millman, J3 paint further changes in the following way.

- (a) After some time from production, top paint surface is removed to show black and white pigment on top, which results in the chalking, and appearance becomes whiter. This change is exacerbated by anatase form of Titanium Dioxide which releases electron and degrades paint (this effect is utilized in the stain preventing wall paint). On the other hand, maintenance crews very often wipe off chalky surface which causes reduction of speed, so to what extent top surface looked white depends on each a/c.
- (b) On further elapse of time top paint surface is peeled off more, and degradation of benzyl cellulose progresses further to wear yellowish brown color. But during a few years of conflict the paint would be faintly tinted to yellow brown.

Included in this decal is the visualization of such changes. This does not guarantee the colors are correct, but please understand that J3 paint appearance probably changes in this way. Surface colors should be different from each a/c, but in this decal their side views are shown as "greenish light grey".

### **(4) Other standard colors**

\*Hinomaru red color—Kariki 117 shows four red colors, B1~B4. In the early days relatively bright B3 was used for Hinomaru red, but as it was found this color is too bright in flying over the oceans, less bright B2 color was adopted in 1931 (ref. N). Ref. A color photo shows that it is slightly darker than FS11310, but to apply to models they should be somewhat brighter. This pigment is made of organic red paint bonded on Barium Sulfate and has very stable and bright red appearance (ref. E, O). It is presumed that this pigment was also used for red fuselage bands and red tail codes, but there seems to be no directive to clearly indicate so. In the case of AII-106/Kaga Fighter Group, fuselage stripes were painted in a brighter red color than Hinomaru red.

\*Dark green color—Kariki 117 shows 6 green colors, D0~D5. Report #0266 concludes that dark green color D1 is best suited for camouflage of Zero fighter, but the color chosen should be D2. As Director Katabuchi pointed out in ref. P, this



should be due to confusion of two provisional green names by the report writer as follows.

In the beginning of the report the two green colors tested were given the following provisional names with numbers.

\* D1 as "dark green black". Zero fighter Yo-107 was camouflaged in this green color and J3 grey color. (As this report clearly distinguishes J3 color and Ameiro, fresh J3 color should have been applied on Yo-107.)

\* D2 as "green black". This was applied on all upper surface of Yo-109.

These two provisional names were often confused in the report, and the conclusion says (without numbers cited) "dark green black" is best, and the second best is two tone camouflage of "green black" and J3 grey.

Koukaku 8609 set new unified green color 1-2 for Army and Navy, and the table there shows Navy D2 is the standard color, and Army No. 27 blue green is close match. Ref. N says D2 was painted on upper surface of Zero fighter, and D1 used with night reconnaissance a/c. But it is July 1943 that Navy released order to paint D2 on upper surface of Zero and J3 on lower surfaces.

Ref. A shows D2 as very dark green, slightly darker than FS34079, but when applying on Zero models, it should be brighter to match the scale effect.

\*Blue color---Kariki 117 shows 4 blue colors, E1~E4, and it is known that E4 is clear blue color originally and painted on the inner surface of Zero, but when benzyl cellulose turns yellow this color changes to blue green color named "Aotake" (young bamboo) color (ref. K, N). Blue color of Zero fuselage/wing bands is not known. Through discussion with Mr. Millman, we chose the brighter E2 color in this decal.

\*Yellow color---Kariki 117 shows 4 yellow colors, C1~C4. More reddish C1 color (equal to FS32544 in ref. A) is used for yellow band on leading edge of wings and Zero trainer, while less reddish C2 color (equal to FS23538 in ref. A) for aircraft bands and codes. A slightly brighter color is used in this decal.

\*Black---black color was applied on engine, cowling (both surfaces), exhaust pipes, upper fuselage area within windshield and canopy, inside of windshield/canopy frames, and headrest (made of synthetic leather, but painted in matt black). According to the book "Materials for Aircraft and its Chemistry" (written by Mr. Tsuruo Araki and published by Maruzen in 1944), black paint Q1 for light metals contains carbo black and its 25 wt % ultra marine pigment in benzyl cellulose. But when the supply of benzyl cellulose became limited, Navy requested to use nitrocellulose as much as possible by the directive of October 8<sup>th</sup>, 1943, and Nakajima seems to have corresponded to this directive quickly and stopped use of ultra marine pigment. From around this time Nakajima Zero cowling became completely black, while Mitsubishi continued to use benzyl cellulose and ultra marine pigment, and the cowling of Mitsubishi Zeros remained blue black (ref. F).

\*Propeller---In the early days front surface was polished natural metal with two red bands on propeller tip, and rear surface was painted in dark brown color (N0/N1 of Kariki 117, ref. A shows unrealistically darker color sample, so please see the color photo in ref. C). Spinner was painted aluminum. From around the end of 1943 both surfaces of propeller and spinner were painted in dark brown color with broad yellow band on tip of propeller. But it is said that in the front-line unit these colors were applied from around fall of 1943, and sometimes spinner was painted in dark green.

\*Cockpit interior---this area was painted in M1 color of Kariki 117 (glossy light green color, and slightly brighter than FS24172 in ref. A), and consoles were painted in D2 (ref. R).

\*Landing gear---painted in black. Torque link in grey or silver, and oleo part in glossy NMF.

\*Landing gear cover---Mitsubishi painted this area in grey J3 color, but Nakajima in blue E4 color which soon changed to blue-green color (Aotake color).

\*Landing gear well---photo in ref. C shows Nakajima painted this area in blue E4 color, but Mitsubishi applied J3 paint over it.

\*Wheel---Tire is of course black, and wheel/wheel cover is NMF, but better to paint them in dull silver with small grey



color, ref. C)

#### (5) Size of Hinomaru and its position (ref. C, L)

Size of Hinomaru is rigorously stipulated as below, and Mitsubishi/Nakajima followed this rule.

Type	Wing Hinomaru	Fuselage Hinomaru
11~32	88cm (1.83cm on 1/48 scale) =mark A	75cm (1.56cm on 1/48 scale) =mark J
52	117cm (2.44cm on 1/48 scale) =mark E	75cm (1.56cm on 1/48 scale) =mark J

When white or dark green outline is applied to these Hinomarus, Mitsubishi and Nakajima adopted different practice.

(Mitsubishi)

- (A) Mitsubishi did not apply white outline to Hinomaru before introduction of dark green camouflage on upper surface.
- (B) When this order was released, Mitsubishi applied 75mm white outline on fuselage and upper wing Hinomarus in their plant from June 1944. Lower wing Hinomaru was left without white outline.

(Nakajima)

- (A) Nakajima produced type 21 Zero from December 1941 up to May 1944. From around summer 1942 Nakajima applied white outline (75mm) to fuselage Hinomaru ONLY to make distinctions from Mitsubishi Zeros.
- (B) When application of dark green camouflage is decided, Nakajima applied 30mm white outline on fuselage and upper wing Hinomarus in their plant from March 1944. Lower wing Hinomaru was left without white outline.

In the area of severe air combat or no air superiority, frontline units very often applied Dark Green camouflage on upper surface and white outline of Hinomaru to conceal them. And both Mitsubishi and Nakajima stopped applying white outline from January 1945.

These changes are summarized as follows.

Type	Wing Hinomaru	Fuselage Hinomaru
11~32	88cm (1.83cm on 1/48 scale) = mark A	75cm (1.56cm on 1/48 scale) = mark J
Mitsubishi	add white outline-->C, paint with DG-->I	add white outline-->L, paint with DG-->M
Nakajima	add white outline-->B, paint with DG-->D	add white outline-->L, paint with DG-->M
52	117cm (2.44cm on 1/48 scale) =mark E	75cm (1.56cm on 1/48 scale) =mark J
Mitubishi	add white outline-->G, paint with DG-->H	add white outline-->L, paint with DG-->M
Nakajima	add white outline-->F, paint with DG-->K	add white outline-->L, paint with DG-->M

88cm Hinomaru (excluding outline) was applied from 88cm from wing tip (ref. x), and no position change with type 32 Zeros with shortened wings (making it appear further outwards on wing). 117cm Hinomaru (excluding outline) was applied from 127.5cm from wing tip (ref. y). Fuselage Hinomaru (excluding outline) is applied from 2cm behind 7<sup>th</sup> panel line. Zero trainer (A6M2-K) and some Zero with overall dark green camouflage (typically training units) had white outline on lower wing Hinomaru as well to make it distinct.

#### (6) Color of Zero trainer (A6M2-K)

This point is also clarified by the research of Director Katabuchi (ref. Q). Imperial Navy released a directive on December 2, 1938, to paint trainers and experimentail aircraft in orange yellow C2 color overall (excluding cowling and anti-glare), but changed the color to C1 (more orange, close to FS32544 in ref. A) by the directive of July 3, 1943. Thus, Zero trainer was always painted in C1 color, and Hinomaru had white outline to make it distinct. When Mariana Islands fell into the hands of US forces in 1944, and attack on Japanese homeland became more likely, the upper surface of Zero trainer were painted in dark green color.

Difficulty lies in assessing the color of Zero fighters which were transferred to training units from front line units. They usually wore the dark green/J3 camouflage scheme of frontline units in the beginning, but at some later time their lower surfaces were re-painted to orange yellow C1. In b/w photos the distinction between J3 and C1 is not clear, but if the



demarcation on the rear fuselage is wavy type, or white outline is added to lower wing Hinomaru, those Zeros probably had orange yellow C1 on their lower surface.

**(7) Two tone camouflage paint applied on early Zero type 11 in Chinese front.**

Some of type 11 Zeros of 12 Kokutai deployed to China in the fall of 1940 clearly show a darker hue from cowl to the center of Hinomaru and wing root to the middle of wings. The reason for this difference has been unknown for many years. One theory tried to explain this was caused by the sunshade which covers cockpit and inner wing area like the case of 3<sup>rd</sup> Kokutai Zero in Kendari (SWPA) and claiming the uncovered area becoming whiter. But the position of sunshade is not in close match to the demarcation line. Besides China is about the same latitude as in Japan, and there is no strong sunshine which needs sunshade. There is no photo of early Zeros in Japan with such sunshade coverage. The clear demarcation line cannot be done without painting. The number of Zero type 11 with such two-tone camouflage is rather limited, and most of 12<sup>th</sup> Kokutai Zero were painted in J3 color overall.

This mystery was finally solved by ref. H (author unknown). In this document one technician painting Zero Fighter in Mitsubishi Factory clarified that early production Zeros (up to p/n 36) had exhaust pipe at one cowl flap above later production model (page44 of ref. S), and forward fuselage and inner wing surface became stained with engine oils. After several trials a new paint with anti-skid powder added to J3 paint (what was this powder is not shown, but overall appearance became darker than J3 paint) was applied from forward fuselage up to center of Hinomaru and wing root to the middle of wings. There is a diagram showing this painting area in ref. H. With this trouble in mind exhaust pipe position was lowered from p/n37, and he said there was no need to paint Zero in two colors. But closer look at 12<sup>th</sup> Kokutai Zeros shows that this two-tone camouflage was applied to some Zeros with lowered exhaust pipe, so this practice should have been maintained for some time.

**(8) Rank name of Navy pilots---ref. T**

Around the time of Pacific War, Navy pilot rank designation changed as shown below. (Equivalent Japanese rank designation is also shown.) As the number of ranks in Imperial Navy differs from that of Royal Navy or US Navy/Marines, and their designation sometimes differ depending on references, we decided to take the below listed after several discussions with Mr. Millman.

1941/8/1~1942/10/31		1942/11/1~end of Pacific War	
大佐	Captain (Cap.)	大佐	Captain (Cap.)
中佐	Commander (Com.)	中佐	Commander (Com.)
少佐	Lt. Commader (Lt. Com.)	少佐	Lt. Commader (Lt. Com.)
大尉	Lieutenant (Lt.)	大尉	Lieutenant (Lt.)
中尉	Lieutenant (Junior Grade) (Lt. (JG))	中尉	Lieutenant (Junior Grade) (Lt. (JG))
少尉	Ensign	少尉	Ensign
飛行兵曹長(飛曹長)	Warrant Officer (W.O.)	飛行兵曹長(飛曹長)	Warrant Officer (W.O.)
一等飛行兵曹(一飛曹)	Petty Officer 1/C (PO 1/C)	上等飛行兵曹(上飛曹)	Chief Petty Officer (CPO)
二等飛行兵曹(二飛曹)	Petty Officer 2/C (PO 2/C)	一等飛行兵曹(一飛曹)	Petty Officer 1/C (PO 1/C)
三等飛行兵曹(三飛曹)	Petty Officer 3/C (PO 3/C)	二等飛行兵曹(二飛曹)	Petty Officer 2/C (PO 2/C)
一等飛行兵(一飛)	Naval Aviation Pilot 1/C (NAP 1/C)	飛行兵長(飛長)	Naval Aviation Pilot Leader (NAPL)
二等飛行兵(二飛)	Naval Aviation Pilot 2/C (NAP 2/C)	上等飛行兵(上飛)	Chief Naval Aviation Pilot (CNAP)
三等飛行兵(三飛)	Naval Aviation Pilot 3/C (NAP 3/C)	一等飛行兵(一飛)	Naval Aviation Pilot 1/C (NAP 1/C)
四等飛行兵(四飛)	Naval Aviation Pilot 4/C (NAP 4/C)	二等飛行兵(二飛)	Naval Aviation Pilot 2/C (NAP 2/C)

to

**(9) Difference between Mitsubishi and Nakajima built Zeros.**

Appearance of Mitsubishi and Nakajima built Zeros differ in the following points.

- Nakajima started production of type 21 from December 1941, and from around autumn 1942 Nakajima applied white outline (75mm) to fuselage Hinomaru ONLY to make distinctions from Mitsubishi Zeros (ref. C, U). If Zero is painted in J3 color overall and has white outline on fuselage Hinomaru, it should be Nakajima-built Zero.
- When dark green camouflage is introduced on upper surface, Mitsubishi Zero had rear fuselage demarcation line in



a straight way, while Nakajima Zero had this line climbing upward to horizontal tailplane and then descending to the end of fuselage (ref. C).

- As shown above, following the Navy Directive of October 8<sup>th</sup>, 1943, Nakajima seems to have stopped use of benzyl cellulose and ultra marine pigment. From around this time cowling of Nakajima Zero became completely black, while Mitsubishi continued to use benzyl cellulose and ultra marine pigment, and the cowling of Mitsubishi Zeros remained blue black (ref. F).

#### **(10) Nameplate on rear fuselage**

The nameplate on rear fuselage shows type of Zero, production number with manufacturer's name and date, and is usually applied in front of horizontal stabilizer. In case of donated a/c with Houkoku number, this plate is applied in the plant aft of Houkoku number and below horizontal tailplane. According to ref. U, Nakajima simplified Zero production process (so that they can produce vast number of Army a/c and Zero type 21 and 52), and in the frontline unit Nakajima Zero was maintained separately from Mitsubishi Zero. Probably Nakajima used same tool for Army aircraft. Mr. Millman received a photo of a toolbox of maintenance crew in Atsugi AB, and in the box there was a spanner inscribed with "中" (Naka) mark, which probably meant for Nakajima built Zeros. The famous line-up photo of 653<sup>rd</sup> Kokutai shows Mitsubishi and Nakajima Zeros are lined-up in separate line, which probably means maintenance of Nakajima and Mitsubishi Zeros were done with different tools. Thus, nameplate has vital information for ground crews. Some illustrations of Iwamoto's Zero shows kill marks covering entire name plate, but ground crews would never have done this. If kill marks covers name plate, it should be restricted to left column only, like Tanimizu's Zero of 203<sup>rd</sup> Kokutai. In some case of Zeros deployed to Rabaul, this nameplate cannot be found in the left side photo, but in most cases the nameplate is masked neatly before application of dark green color.

#### **(11) Allocation of aircraft to pilots**

In Imperial Navy "leader" pilots had specific aircraft assigned, but non-leader pilots did not have such assigned aircraft, and on the day of the sortie each pilot was assigned to an aircraft with maintenance finished shown on the black board. When the preliminary assignment is not done (as in a scramble), Mr. Ryoji Ohara (ace pilot) told to NHK interviewer that he rushed to his favorite aircraft, type 32 Zero "Hamp" (ref. V). He said other pilots preferred to take type 21 or 22 Zero fighters.

#### **(12) Confirmation of aerial kill**

Unlike western country's fighters, it was quite rare to have gun-camera on the wings of Zero fighter. Super ace W.O. Tetsuzo Iwamoto wrote in his war diary (ref. W) that on December 10<sup>th</sup>, 1943, Japanese movie film crews came to Rabaul to take aerial combat scene, and the commander of 253<sup>rd</sup> Kokutai requested Iwamoto to take gun-camera (instead of one 20mm gun) and take aerial combat scene, but he rejected this request saying it would disadvantage him in aerial combat. The commander finally accepted his rejection but asked him to make combat close to their base so that movie crews could take exciting scenes. This film was subsequently publicized in Japan (ref. X).

It was the practice of Imperial Navy to regard an aerial victory as the achievement of Shotai or Chutai and not regarded as a personal achievement. Besides a pilot's judgement of aerial kills (without gun-camera footage) are made in brief moment during combat, and in many cases pilots' claims do not match the loss report of US/RAF/RAAF side. Thus, the counting of pilot's victory tally in the western way was always difficult. Mr. Hata/Dr. Izawa studied Imperial aviation for many years, and the victory tally shown in their books (ref. Y, Z) are very often regarded as authoritative.

#### **(13) Aircraft wireless radio**

It seems to be true that wireless radio on Zero fighters had much noise (probably due to incomplete insulation). Especially in the Southeastern Pacific area where the aerial combat was quite fierce, some Zeros did not have antenna mast. But in less severely fought area like Southwestern Pacific area, CBI or in Japan, many Zeros had antenna mast



**(Caption for each item)**

**A/C #1, Zero fighter type 21, X-183 flown by PO 2/C Yoshiro Hashiguchi, 3<sup>rd</sup> Kokutai, Kendari AB, February 1942.**

This aircraft is famous for its kill marks, and there are many references showing its photos and illustrations (like ref. 1~10). It is said that this photo was taken in Kendari AB, and its date seems to be in February 1942 before the unit moved to Buton AB (near Kupang). Judging from 11 kill marks on tail, it is often claimed that this a/c was the mount of ace, PO 2/c Hashiguchi, but he was not the leader, and there should be no assigned a/c for him, so it is more reasonable to think that he was among the pilots who flew this a/c. Like other Navy units, kill marks should represent the total kills that this aircraft achieved with several pilots. Ref. 3 shows a very clear view of this kill mark with 3 stamens for each petal. Its rudder looks dark as it is tilted to right to be in the shadow, but less contrasted photo in ref. 4 shows that there is no kill mark on the rudder. As there is another a/c (X-129) of 3<sup>rd</sup> Kokutai whose kill marks on right tail is painted over, we included kill marks on the right side, but no conclusive evidence. Many illustrations show red fuselage band, but the photos in ref. 4 and 5 show that this fuselage band is much lighter than Hinomaru or red band of rear aircraft and even lighter than the red kill marks on its tail. So, this band should be blue. It is out of scope of the photo, but probably the fuselage band is just one. The photo in ref. 6 as well as other 3<sup>rd</sup> Ku Zeros show no maintenance record on cowling or a/c number on landing gear cover, but small number on lower cowling is highly probable (this area is covered by the propeller in ref. 6.) PO 2/C Hashiguchi lived through the fierce air battle over Rabaul and New Guinea, but he went missing when the carrier Chiyoda was sunk. He was later judged as KIA. His final rank is W.O., and he is credited with more than 10 victories (ref. 9).

**A/C #2, Zero fighter type 21, V-117 flown by Lt. Masuzo Seto, Tainan Kokutai, Balikpapan or Denpasar, January~February 1942.**

Only one in-flight photo of this a/c is known, and it is shown in ref. 6, 7 and 11~13, and its illustrations in ref. 14~19. Most of these references says it is the a/c of Lt. Hideki Shingo, but his assigned Zero was another one, so this should be the a/c of Buntaicho, Lt. Masuzo Seto, as shown in ref. 7 and 14. Most of the illustrations show red fuselage diagonal bands and blue tail bands. But when we checked the photo shown in these references with Mr. Ashimoto and Mr. Millman, we noticed that sunshine is reflected strongly on upper fuselage, while lower fuselage sides and vertical tail have about the same degree of reflection. Vertical tail bands are almost the same tone as lower part of fuselage Hinomaru, and diagonal bands are apparently lighter. Thus, we concluded that fuselage diagonal bands are blue, and tail bands are red, as shown in the illustration in ref. 16. As the time is before advance to Rabaul, V-117 is white with thin red outline. Tainan Kokutai has a practice of applying tail bands touching on the tail code. (After advancing to Rabaul, tail code became black.)

Lt. Seto acted as Buntaicho in Tainan Kokutai, and in July 1944 he became the flight leader (rank was Lt. Com.) of newly formed 315 Hikoutai and fought air battles over Philippines. While heading for Philippines on December 4<sup>th</sup>, he ditched at sea and disappeared. He was judged as KIA (ref. 11).

**A/C #3, Zero fighter type 21, 81-1146 of 381<sup>st</sup> Kokutai, Solon AB/Ehman Island, May 1944.**

When Navy official photographer, Mr. Abe, visited 381<sup>st</sup> Kokutai in Solon AB in May 1944, he took photos of this aircraft. They are publicized in ref. 20, and its illustration in ref. 18. Around that time operational area of Navy and Army aircrafts very often overlapped, and to make it easier to identify friendly a/c, Zero fighters painted their outer wings and vertical tail in J3 Grey in addition to the yellow band on wing leading edges. Nose of this a/c is painted in bright color, and the line-up photo (under cloudy sky) in ref. 20 shows this nose section is brighter than the yellow wing band of adjacent a/c. So, its nose should be white. White nose and white band on tail might indicate this is the commander's a/c.

**A/C #4, Zero fighter type 21, EI-111 flown by Lt. Hideki Shingo of Shokaku Fighter Group, October 26, 1942,**



### **Battle of the Santa Cruz Island.**

This item is based on the famous photo of EI-111 taking off from Shokaku. This photo is shown in many references (like ref. 8, 21) and its illustrations are shown in many references (like ref. 8, 10 and 19), Small number 11 can be seen below cowling, but that on landing gear cover is not discernible due to wing shadow. Probably like many other carrier-based Zeros, there should be small a/c number on landing gear cover and maintenance data on left cowling. The date of this photo is controversial, one saying it is Coral Sea Battle and another saying it is Battle of Santa Cruz Island. Mr. Yukinobu Nishikawa checked the position and arrangement of guns on the sides of flight deck and concluded that this photo was taken after recovery (June 1942) from the damage inflicted in the Coral Sea Battle (ref. 11). Thus, this photo was taken at the Battle of Santa Cruz Island, and ref. 22 says Lt. Shingo participated indeed in this battle. After the war he entered Japan Air Self Defense Force and retired as air general. He passed away on November 27, 1982, from pneumonia.

### **A/C #5, Zero fighter type 21, 虎-143 of 261<sup>st</sup> Kokutai, end of 1943 to early 1944, Kagoshima AB.**

Two photos of this a/c are known, one with PO 1/C Yasuhiro Tsubuhari standing besides its tailplane (ref. 23) and another after ditching into the shallow sea (ref. 5), and its illustration is in several references like ref. 17, 18 and 24. Some references claim this marking is after advancing to Marianas, but this colorful marking is only for the training period in Japan, and when moving to Marianas, tail code was changed to 61- (ref. 11). Photo in ref. 23 barely shows the white diagonal band on right upper wing, and it is certain that white diagonal bands are applied on both surfaces of both wings (like 虎-110, 153, 172). Only some a/c wore these diagonal bands on wings. White band below tail code starts from the leading edge of vertical fin, but photo in ref. 5 clearly shows this band does not go to the rear end of vertical tail. Reason is not known. Photos of other aircrafts of this unit (ref. 25) show that SOME (not all) have a/c number on lower cowling and landing gear cover (each in white and black), and spinner and propeller are in either NMF (two red bands on propeller tip) or both painted in dark brown. For this a/c no evidence is available, so spinner and propeller are shown in dark brown in this decal.

### **A/C #6, Zero fighter type 21, 雷 134 of 265<sup>th</sup> Kokutai, beginning of 1944, Xinzhu AB/Taiwan.**

Some of 265<sup>th</sup> Kokutai Zero is known to have colorful tail marks, but when it was inaugurated in Kagoshima in November 1943, the unit code was “狼” (wolf), and when it advanced to Taiwan it changed its tail code to “雷” (thunder). (ref. 11 and 26). Photos of Zeros in this base clearly shows that NOT All a/c carried this colorful marking, and some had simple white 雷 on tail. The reason why some a/c had this colorful thunderbolt marking is not known. We know only three such cases, one is the photo of this a/c (with PO 2/C Mitsuo Suzuki leaning on the tail) in ref. 5, another 虎-122 (Mr. Ashimoto kindly gave us this photo.) and the last 虎-15? In ref. 27. Photo in ref. 27 and other photos showing the right tail marking of this unit indicate it is the practice of this unit to apply “雷 1” and last two digits separately on rudder and vertical tail.

### **A/C #7, Zero fighter type 22, #191(?) flown by Lt. (JG) Usaburo Suzuki of 582<sup>nd</sup> Kokutai, Buin AB, April 7, 1944.**

On the first day of “I-Go” Operation (ref. 28) 39 Zeros of 582<sup>nd</sup> Kokutai took off from Buin and Ballare AB. Their target was the enemy convoy and aircrafts in east New Guinea, and Navy named this attack as “Battle of Florida Offshore”. (Admiral Isoroku Yamamoto encouraged pilots in the field, but he was shot down and killed over Bougainville Island.) But this Operation was detected by US intelligence work, and many ships fled to safer area, and US Air Force intercepted attackers with full strength. Although Japanese Navy got some battle results, it lost many experienced pilots and this led to a significant decrease in war capability.

Photo of this a/c starting from Buin AB is shown in ref. 5, 10, 21, and 29, but all these show a/c code hidden by censor. Mr. Ashimoto gave us another photo, but the tail code was scratched off by censor. Ref. 30 shows tail code “191”, but author admits this is not verified. A/C code 191 is shown for a/c #8 in ref. 2 and it is not known whether the author



confused the tail codes or not. But as there is no other reliable reference, we chose this code "191" (red with white shadow) for this a/c. This a/c carries two chevron bands (probably yellow) on fuselage, which is inherited from 2<sup>nd</sup> Kokutai. The dark green paint was applied hastily in the unit, and some part of wings/tails, antenna mast and frames of wind shield and canopy are left uncamoouflaged, and some part of fuselage sides shows J3 Grey camouflage color faintly under dark green camouflage. This is type 22, and should be produced by Mitsubishi, but the area below horizontal tail looks J3. The photo was taken from a distance, and name plate is not visible, but probably re-applied in black. Wartime career of Lt (JG) Suzuki is not well known to us, but he was the flight leader (Lt.) of 265<sup>th</sup> Kokutai (雷 Butai) in June 1944 (ref. 11).

**A/C #8, Zero type 22 Kou, #173 flown by Lt. Com. Saburo Shindo, June 16, 1944, Buin AB**

Caption of the photo of this a/c in ref. 2 says tail code is "191", but later published book (ref. 31) shows two more photos of this a/c (taken by Navy Accounting Lt. (JG) Moriya and captioned as "Air Battle over Lunga"), which clearly shows tail code is "173". This attack (named as "Air Battle over Lunga" by Navy, ref. 32) on June 16<sup>th</sup> was done by combined units of Zero fighters (from 204<sup>th</sup>, 251<sup>st</sup>, and 582<sup>nd</sup> Kokutai) and carrier bombers against US ships off Lunga, but in spite of the big battle results reported by the attackers, the reconnaissance next day showed that the damage to US ships was rather small. On the other hand, Imperial Navy was severely damaged, especially in bombers (54% shot down or damaged) by the interception of about 100 US fighters and its war capability was significantly reduced.

This a/c is type 22 Kou (with long wing guns) fresh from the factory, and dark green paint was neatly applied on upper surfaces including antenna and frames of windshield/canopy, and nameplate on rear fuselage was masked neatly before application of dark green paint in the factory. Two fuselage chevron marks have a slightly different angle to a/c #7.

Wartime career of Saburo Shindo is described in exact detail in ref. 33 and 34. He is famous for the one-sided air battle of 27 victories with no loss as the Buntaicho of 12<sup>th</sup> Kokutai in China. He participated in the Pearl Harbor Attack as Buntaicho of Akagi Fighter Group, then commanded 582<sup>nd</sup> and 653<sup>rd</sup> Kokutai. In the days of Hikotaicho (Flight Commander) of 203<sup>rd</sup> Kokutai, he expressed his opinion against Special Attack to Kokutai Commander, saying that they do not have any pilot who can die in just one sortie. When 302<sup>nd</sup> Kokutai made a mutiny (Atsugi Kokutai Incident) soon after the war, he received a request from 302<sup>nd</sup> Kokutai to shoot down the a/c that surrender mission members are on board, but he instantly rejected the request, saying "why can we shoot down friendly aircraft!". After the war he was bewildered by big change of values, and sometimes regarded as a war criminal (though he was appraised as hero in the war days). He joined Toyo Kogyo (currently Matsuda Automobile Industry), became the leader of maintenance department, and retired as executive managing director. He died peacefully in his home on February 2<sup>nd</sup>, 2000.

**A/C #9, Zero fighter type 21, 81-1138 of 381<sup>st</sup> Kokutai, Solon AB/Ehman Island, May 1944.**

In the same way as a/c #3, the photo of this a/c was taken by Navy official photographer, Mr. Abe in May 1944 in Solon AB, and the photos are shown in ref. 20 and illustration in ref. 18. Its camouflage is the same as a/c #3, but it has a unique Houkoku mark. Lack of Houkoku sequential number indicates it is not applied in Japan. Also the meaning of "セラム" (Sellam??) is unknown. This mark might indicate the appreciation of hard work local people contributed to set up an airfield. Photos show this Houkoku mark is applied on both sides of fuselage, and it carries type 3 air-to-air bombs (to attack heavy bombers).

**A/C #10, A6M2-K, ツ-415 of Tsukuba Kokutai, Misawa AB/Aomori Pref., September 1944.**

The only photo of this trainer is shown in ref. 5 and 27, and illustration in ref. 19 and 32. According to ref. 27, Tsukuba AB was constructing a second runway at that time, and this photo was taken at Misawa AB. Trainees of Tsukuba AB were indeed trained at Misawa AB for about 2 months. Dark green paint was applied on the upper surface over the orange yellow camouflage, except upper tail section and antenna. Black anti-dazzle paint (from cowling to windscreen)



was no longer necessary for dark green painted trainer. The demarcation on rear fuselage is a waved type unique to training group Zeros. As shown in the photos of other A6M2-K, this a/c should have white outline of Hinomaru and large a/c code on lower wings. Some A6M2-Ks of training Kokutai have NMF spinner, and others painted in dark brown. As the spinner/propeller of this a/c is out of photo, NMF spinner is tentatively shown.

**A/C #11, Zero fighter type 21, BII-124 flown by NAP 1/C Hajime Toyoshima of Hiryu Fighter Group, February 19, 1942, Melville Island.**

Photos of this crashed Zero is shown in ref. 33 to 37, and illustration in ref. 16 and 38. On February 19, 1942, NAP 1/C Hajime Toyoshima took this a/c to attack Port Darwin, but was hit in the engine by flak, and crashed into a bush of Melville Island. He suffered only minor injury, but the a/c was badly damaged. He quickly left the crash point, but was soon arrested by local people, and was sent to an Australian POW camp. In Japan he was regarded as KIA, and was promoted to PO 3/C. In Australia he used a false name of W.O. Tadao Minami and was living a calm life in the camp, and quickly acquired English speaking ability. But he had a dilemma with military discipline of "not to live shamefully as a POW", and he led escape of many soldiers from Kaula prison camp, was shot down and finally committed suicide by cutting his throat with a borrowed knife. In 1981 Tadao Minami was found equal to Hajime Toyoshima by the research of Mr. Ikuo Hata (author of ref. 9, 11 and 12). Crashed aircraft is preserved in Australian Aviation Heritage Center, and members of Sweet checked its J3 color and Hinomaru size and position (ref. G), as shown in the above "General Notes". Tone or hue of blue in b/w photos varies significantly by the development or printing conditions. Ref. 35 and 36 show the same photo. Photo in ref 35 shows blue band is faintly printed, but the photo in ref. 36 shows blue band is clearly printed. Photos of this a/c in ref. 33 and 37 also shows distinct bands. Some reference claim that this blue should be "sky blue" from the photo of ref. 35, but especially for blue color judgment should be prudent to check several related photos. Nameplate on rear fuselage was masked before application of blue band. Photo in ref. 34 does not show maintenance record on left cowling, but it is highly probable that small a/c number was applied on lower cowling and landing gear cover, as this a/c took off from carrier Hiryu. Photo of ref. 36 and 37 shows that blue fuselage bands does not wrap around the fuselage. This a/c shows Buntaicho band on tail, but Toyoshima was not a Buntaicho. Probably this discrepancy is derived from the maintenance condition and pilot assignment of the day.

**A/C #12, A6M2-N, 34-116 of 934<sup>th</sup> Kokutai, March 1943, Halong seashore base/Ambon Island.**

Photo of this a/c is shown in ref. 20, and illustration in ref. 18 and 20. According to ref. 11, unit code of 934<sup>th</sup> Kokutai is red "934", but all the aircrafts in this reference show red 34 tail code. "934" code should have been applied at some period, but it is not known which is the earlier code or when the code was changed. The illustration in ref 18 or 20 shows yellow tail code, but the photo clearly shows tail code is about the same tone as Hinomaru red under cloudy sky, and same tonal similarity is also observed with Pete (F1M1) and Rex (N1K1) (with white outline on Hinomaru) of 934<sup>th</sup> Kokutai in ref. 20, so tail code should be red. White outline of fuselage Hinomaru is painted over with dark green color, and the same should be true on upper wing Hinomaru. Fuselage lightning bolt is lighter than Hinomaru or tail code and should be either white or yellow. In this decal we chose yellow, as this is the same unit as a/c #13. Some part of its float is not overpainted with dark green color.

**A/C #13, A6M2-N, 934-116 flown by PO 1/C Hidenori Matsunaga of 934<sup>th</sup> Kokutai, March 1943 to April 1944, Halong seashore base/Ambon Island.**

The interview article by Mr. Kazuhiko Osuo and its illustration is shown in ref. 39, but regrettably its photo was not shown there. We found the photo of this a/c in ref. 40, and the details of lightning bolt mark precisely matches that of the illustration in ref. 39. According to this article (Mr. Osuo's interview with Mr. Matsunaga himself), Mr. Matsunaga said this YELLOW lightning bolt represents the furious attack of A6M2-K. PO 1/C Matsunaga was the top scoring ace with 11 confirmed and 7 unconfirmed victories in 934<sup>th</sup> Sentai. His final rank is CPO. The illustration based on this article is



also shown in ref. 8. Photo of ref. 40 shows the lightning bolt is broader than a/c #12, and they are different aircrafts. It seems that top of spinner is painted in dark green, and some part of its float is not overpainted with dark green.

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