III a (16) NAKAJIMA A/C KOIZUMI

76

AREA OF SITE 7,875,000. SQ. FT.			
PRIMARY OBJECTIVES	WHOLE TARGET		
NO. BLDGS. 11	NO. BLDGS. 58		
NO. FIRE DIVS. 11	NO. FIRE DIVS. 117		
PLAN AREA 2,125,000. SQ. FT.	PLAN AREA 3,350,000 SQ. FT.		
FLOOR AREA 2,125,000. SQ. FT.	FLOOR AREA 3,350,000 SQ. FT.		

— JOINT TARGET GROUP —

FIRE ANALYSIS CHART

TARGET: NAKAJIMA AIRCRAFT PLANT

LOCATION: KOIZUMI, JAPAN

INTERNAL USE IN PHYSICAL VULNERABILITY SECTION ONLY

CONFIDENTIAL

PAGE 1 (3 pages)

DATE: 19 JAN. 1945

ANALYST:

AREA NO. 90.13 / 1545 TARGET NO.

TARGET COMBUSTIBILITY

FIRE DIVISION NUMBER	SUBDIVISION	OCCUPANCY (U/I = Unidentified)	TYPE	PLAN AREA (000'S SQ. FT) (A)	NO. FLOORS	TOTAL FLOOR AREA (000'S SQ FT) (A_T)	OCCY. COMB β	% VULN TO FIRE α	I.P.	$A_T \times$ I.P. (7×10)	$\alpha \times A_T \times$ I.P. (9×11)	$\alpha \times A_T$ (7×9)
1	2	3	4	5	6	7	8	9	10	11	12	13
1		Storage	C	13.3	1	13.3	20	100	10	1	1.0	
2		Storage or Shop	C	37.5	1	37.5	20	100	20	8	8.0	
3		Shop (forge or heat tr.)	N	28.5	1	28.5	10	15	40	11	1.7	
4		Storage	C	14.2	1	14.2	20	100	10	1	1.0	
5		Component Shop	C	42.0	1	42.0	20	100	40	17	17.0	
6		Storage	C	10.2	1	10.2	30	100	10	1	1.0	
7		"	N	12.6	1	12.6	20	30	10	1	1.0	
8		"	C	9.1	1	9.1	20	100	10	1	1.0	
9		"	C	5.0	1	5.0	20	100	10	1	1.0	
10		Receiving	C	19.6	1	19.6	30	100	20	4	4.0	
11	a	Sub assembly Assembly	N	416.0	1	416.0	20	30	70	291	87.3	124.5
11	b,c	Storage & Pass.	C	31.2 6.4	1	37.6	25	100	20	8	8.0	37.6
12	a	Sub Assembly & Assembly	N	220.4	1	220.4	20	30	70	154	46.2	66.2
12	b,c	Storage & Pass.	C	34.8 8.0	1	42.8	25	100	20	9	9.0	42.8
14	a	Sub Assembly & Assembly	N	151.2	1	151.2	20	30	100	151	45.3	45.3
14	b,c	Storage & Pass.	C	16.8 4.8	1	21.6	25	100	20	4	4.0	21.6
13	a	Sub Assembly	N	199.8	1	199.8	20	30	70	140	42.0	60.0
13	b,c	Storage & Pass.	C	22.2 4.8	1	27.0	25	100	20	5	5.0	27.0
15		Storage	C	11.9	1	11.9	20	100	10	1	1.0	
16		"	C	4.9	1	4.9	20	100	10	1	1.0	
17		"	C	11.2	1	11.2	20	100	10	1	1.0	
18		"	C	11.9	1	11.9	20	100	20	2	2.0	
19	a,b,c	"	C	25.8	1	25.8	20	100	20	5	5.0	
20		"	C	51.0	1	51.0	30	100	20	10	10.0	
21	a,b	"	C	44.0 14.0	1	58.0	20	100	20	12	12.0	
22		Machine Shop	N	123.0	1	123.0	20	30	80	91	27.3	36.9
23	a,b,c	Storage	C	16.0	1	16.0	20	100	20	3	3.0	
24		Machine Shop	N	44.0	1	44.0	20	30	80	35	10.5	13.2
25	a	Pressing Small Parts Mfg.	N	209.3	1	209.3	20	30	100	209	62.8	62.8
25	b,c	Storage & Pass.	C	27.3 7.2	1	34.5	25	100	20	7	7.0	34.5
26	a	Sub Assembly	N	273.0	1	273.0	20	30	100	273	82.0	82.0

M-47 WEAPON ANALYSIS

NUMBER	SUBDIVISION	PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	$\alpha \times A_T \times$ I.P. (12)	$AP_f \times \alpha \times A_T \times$ I.P. (25×26)
1	2	14	15	16	17	18	19	20	21	22	23	24	25	26	27
11	a	90	90	02	75							416.0	5.05	87.3	441.0
11	b,c	90	90	100	80		100		90			6.27	3.65	8.0	29.2
12	a	90	90	04	75							220.4	5.36	46.2	247.0
12	b,c	90	90	100	80		100		90			6.10	3.57	9.0	32.1
14	a	90	90	05	75							151.2	4.59	45.3	208.0
14	b,c	90	90	100	80		100		90			4.32	2.52	4.0	10.1
13	a	90	90	04	75							199.8	4.86	42.0	204.0
13	b,c	90	90	100	80		100		90			5.40	3.14	5.0	15.7
22		90	90	07	70							123.0	4.88	27.3	133.0
24		90	90	18	70							44.0	4.49	10.5	47.2
25	a	90	90	04	75							209.3	5.08	62.8	319.0
25	b,c	90	90	100	80		100		90			5.75	3.35	7.0	23.5
26	a	90	90	03	75							273.0	4.98	82.0	408.0

M-50 WEAPON ANALYSIS

NUMBER	SUBDIVISION	PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	$\alpha \times A_T \times$ I.P. (12)	$AP_f \times \alpha \times A_T \times$ I.P. (39×40)
1	2	28	29	30	31	32	33	34	35	36	37	38	39	40	41
11	a	80	80	20	40	02						416.0	.426	87.3	37.1
11	b,c	80	80	25	50		100		90			6.27	.452	8.0	3.62
12	a	80	80	20	40	04						220.4	.451	46.2	20.8
12	b,c	80	80	25	50		100					6.10	.440	9.0	3.96
14	a	80	80	20	40	05						151.2	.388	45.3	17.6
14	b,c	80	80	25	50		100		90			4.32	.310	4.0	1.24
13	a	80	80	20	40	04						199.8	.409	42.0	17.2
13	b,c	80	80	25	50		100		90			5.40	.388	5.0	1.94
22		80	80	20	35	07						123.0	.386	27.3	10.5
24		80	80	20	35	18						44.0	.355	10.5	3.7
25	a	80	80	20	35	04						209.3	.374	62.8	23.5
25	b,c	80	80	25	50		100		90			5.75	.414	7.0	2.9
26	a	80	80	20	40	03						273.0	.419	82.0	34.4

M-69 WEAPON ANALYSIS

NUMBER	SUBDIVISION	PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	$\alpha \times A_T \times$ I.P. (12)	$AP_f \times \alpha \times A_T \times$ I.P. (25×26)
1	2	14	15	16	17	18	19	20	21	22	23	24	25	26	27
11	a	80	85	35	40	02						416.0	1.09	87.3	95.3
11	b,c	80	85	40	50		100		90			6.27	.997	8.0	7.97
12	a	80	85	35	40	04						220.4	1.15	46.2	53.2
12	b,c	80	85	40	50		100		90			6.10	.971	9.0	8.73
14	a	80	85	35	40	05						151.2	.990	45.3	44.8
14	b,c	80	85	40	50		100		90			4.32	.687	4.0	2.75
13	a	80	85	35	40	04						199.8	1.05	42.0	44.1
13	b,c	80	85	40	50		100		90			5.40	.858	5.0	4.29
22		80	85	35	35	07						123.0	1.02	27.3	27.9
24		80	85	35	35	18						44.0	.952	10.5	10.0
25	a	80	85	35	35	04						209.3	.992	62.8	62.3
25	b,c	80	85	40	50		100		90			5.75	.915	7.0	6.40
26	a	80	85	35	40	03						273.0	1.07	82.0	87.8

AREA OF SITE 7,875,000. SQ. FT.	— JOINT TARGET GROUP —	INTERNAL USE IN PHYSICAL VULNER-ABILITY SECTION ONLY
PRIMARY OBJECTIVES	WHOLE TARGET	CONFIDENTIAL · PAGE 2
NO. BLDGS. 11	NO. BLDGS. 58	
NO. FIRE DIVS. 11	NO. FIRE DIVS. 117	
PLAN AREA 2,125,000. SQ. FT.	PLAN AREA 3,350,000. SQ. FT.	
FLOOR AREA 2,125,000. SQ. FT.	FLOOR AREA 3,500,000 SQ. FT.	

FIRE ANALYSIS CHART

TARGET: NAKAJIMA AIRCRAFT PLANT

LOCATION: KOIZUMI, JAPAN

DATE: 19 JAN. 1945

ANALYST:

AREA NO. 90.13

TARGET NO. 1545

TARGET COMBUSTIBILITY

FIRE DIVISION NUMBER	SUBDIVISION	OCCUPANCY	TYPE	PLAN AREA (000'S SQ. FT) (A)	NO. FLOORS	TOTAL FLOOR AREA (000'S SQ. FT) (A_T)	OCCY. COMB. β	% VULN TO FIRE α	I.P.	A_T × I.P. (7×10)	α × A_T × I.P. (9×11)	α × A_T (7×9)
1	2	3	4	5	6	7	8	9	10	11	12	13
26	b,c	Storage & Pass.	C	45.5 7.2	1	52.7	25	100	20	11	11.0	
27		U/I	C	16.8	1	16.8	20	100	20	3	3.0	
28		"	C	24.8	1	24.8	20	100	20	5	5.0	
29		"	C	14.4	1	14.4	20	100	20	3	3.0	
30	a	Sub Assembly	N	247.2	1	247.2	20	30	100	247	74.2	74.2
30	b,c	Storage & Pass.	C	30.9 7.2	1	38.1	25	100	20	8	8.0	38.1
31	a	Sub Assembly & Assembly	N	181.5	1	181.5	20	30	70	127	38.1	54.5
31	b,d	Storage & Pass.	C	30.6 3.2	1	33.8	25	100	20	7	7.0	33.8
31	c	Machine Shop	N	58.8	1	58.8	20	30	80	47	14.1	17.6
32		U/I	C	20.0	2	40.0	20	100	20	8	8.0	
33		Boiler House	N	10.0	1	10.0	05	075	50	5	0.4	
34	a	Storage	C	5.0	1	5.0	20	100	20	1	1.0	
34	b	"	C	6.0	2	12.0	20	100	20	2	2.0	
35	a	Shop	N	66.5	1	66.5	20	30	60	40	12.0	20.0
35	b	Storage & Pass.	C	5.7	1	5.7	25	100	20	1	1.0	
36	a,b,c	U/I	N	23.8	1	23.8	20	30	30	7	2.1	
36	d	"	R	7.2	1	7.2	20	20	30	2	0.4	
36	e	Office	N	5.4	2	10.8	40	30	20	2	0.6	
37		Storage	C	6.0	1	6.0	20	100	20	1	1.0	
38		"	C	14.0	1	14.0	20	100	20	3	3.0	
39	a,b,c	Office	R	11.4	2	22.8	40	20	20	5	1.0	
40		"	R	12.0	2	24.0	40	20	20	5	1.0	
41		U/I	C	14.4	1	14.4	20	100	20	3	3.0	
42	a	Office	R	18.5	3	55.5	40	13	20	11	1.4	
42	b	"	R	18.5	3	55.5	40	13	20	11	1.4	
42	c	"	R	3.5	3	10.5	20	07	20	2	0.1	
43		Storage	C	11.5	2	23.0	30	100	20	5	5.0	
44	a-d	Office	C	14.7	1	14.7	40	100	20	3	3.0	
45		Storage	C	7.5	1	7.5	30	100	10	1	1.0	
46		"	C	22.5	1	22.5	30	100	20	5	5.0	
47		"	C	6.0	1	6.0	30	100	10	1	1.0	

M-47 WEAPON ANALYSIS

FIRE DIVISION	PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	α × A_T × I.P. (12)	AP_f × α × A_T × I.P. (25×26)
	14	15	16	17	18	19	20	21	22	23	24	25	26	27
26 b,c	90	90	100	80		100		90			8.78	5.12	11.0	56.3
30 a	90	90	03	75							247.2	4.50	74.2	334.0
30 b,c	90	90	100	80		100		90			6.35	3.70	8.0	29.6
31 a	90	90	04	75							181.5	4.41	38.1	168.0
31 b,d	90	90	100	80		100		95			5.63	3.47	7.0	24.3
31 c	90	90	14	70							58.8	4.67	14.1	65.9
35 a	90	90	12	70							66.5	4.52	12.0	54.3
													600.8	2,850.2

$AP_f = \frac{2850}{601} = \underline{4.74}$ 1000's ft^2/M-47

$M_I = 30 \times 4.74 = \underline{142.0}$ 1000's ft^2/ton M-47

M-50 WEAPON ANALYSIS

FIRE DIVISION	PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	α × A_T × I.P. (12)	AP_f × α × A_T × I.P. (39×40)
	28	29	30	31	32	33	34	35	36	37	38	39	40	41
26 b,c	80	80	25	50		100		90			8.78	.632	11.0	6.95
30 a	80	80	20	40	03						247.2	.379	74.2	28.1
30 b,c	80	80	25	50		100		90			6.35	.456	8.0	3.65
31 a	80	80	20	40	04						181.5	.372	38.1	14.2
31 b,d	80	80	25	50		100		95			5.63	.428	7.0	3.00
31 c	80	80	20	35	14						58.8	.369	14.1	5.2
35 a	80	80	20	35	12						66.5	.357	12.0	4.3
													600.8	243.86

$AP_f = \frac{244}{601} = \underline{.406}$ 1000's ft^2/M-50

$M_I = 475 \times .476 = \underline{193.0}$ 1000's ft^2/ton M-50

M-69 WEAPON ANALYSIS

FIRE DIVISION	PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	α × A_T × I.P. (12)	AP_f × α × A_T × I.P. (39×40)
	28	29	30	31	32	33	34	35	36	37	38	39	40	41
26 b,c	80	85	40	50		100		90			8.78	1.40	11.0	15.4
30 a	80	85	35	40	03						247.2	.970	74.2	71.9
30 b,c	80	85	40	50		100		90			6.35	1.01	8.0	8.08
31 a	80	85	35	40	04						181.5	.950	38.1	36.2
31 b,d	80	85	40	50		100		95			5.63	.947	7.0	6.63
31 c	80	85	35	35	14						58.8	.980	14.1	13.8
35 a	80	85	35	35							66.5	.950	12.0	11.4
													600.8	618.95

$AP_f = \frac{619}{601} = \underline{1.03}$ 1000's ft^2/M-69

$M_I = 217 \times 1.03 = \underline{224.0}$ 1000's ft^2/ton M-69

AREA OF SITE 7,875,000. SQ. FT.

PRIMARY OBJECTIVES	WHOLE TARGET
NO. BLDGS. 11	NO. BLDGS. 58
NO. FIRE DIVS. 11	NO. FIRE DIVS. 117
PLAN AREA 2,125,000. SQ. FT.	PLAN AREA 3350,000 SQ. FT.
FLOOR AREA 2,125,000. SQ. FT.	FLOOR AREA 3500,000 SQ. FT.

— JOINT TARGET GROUP —

FIRE ANALYSIS CHART

TARGET: NAKAJIMA AIRCRAFT PLANT

LOCATION: KOIZUMI, JAPAN

INTERNAL USE IN PHYSICAL VULNERABILITY SECTION ONLY

CONFIDENTIAL

DATE: 19 JAN. 1945

ANALYST:

AREA NO. 9013 / 1545 TARGET NO.

FIRE DIVISION NUMBER	FIRE DIVISION SUBDIVISION	OCCUPANCY	TARGET COMBUSTIBILITY TYPE	PLAN AREA (000'S SQ. FT) (A)	NO. FLOORS	TOTAL FLOOR AREA (000'S SQ. FT) (A_T)	OCCY COMB β	% VULN TO FIRE α	I.P.	$A_T \times I.P.$ (7×10)	$A_T \times \alpha$ I.P. (9×11)	$\beta \cdot A_T$ (7×9)
1	2	3	4	5	6	7	8	9	10	11	12	13
48	a,d,e,h,j	Foundry	N	46.4	1	46.4	05	075	40	19	1.4	
48	f,g	"	C	9.8	1	9.8	20	100	40	4	4.0	
48	(h,k) (c)	"	C	14.3	1	14.3	25	100	20	3	3.0	
49		"	C	6.8	1	6.8	20	100	10	1	1.0	
50		"	C	7.6	1	7.6	20	100	10	1	1.0	
51		"	C	11.2	1	11.2	20	100	10	1	1.0	
52		"	C	4.5	1	4.5	20	100	10	1	1.0	
53		"	C	10.0	1	10.0	20	100	10	1	1.0	
54	a,b,c	Shop	C	30.9	1	30.9	20	100	20	6	6.0	
55		"	C	9.1	1	9.1	20	100	20	2	2.0	
57		Storage	C	13.2	1	13.2	20	100	20	3	3.0	
56		"	C	10.5	1	10.5	20	100	10	1	1.0	
58	a,b,c	"	C	10.2	1	10.2	20	100	10	1	1.0	
58	d	"	C	6.9	1	6.9	20	100	10	1	1.0	
				3352.5		3500.3				1864.6008		

$$\alpha = \frac{601}{1864} = 32.2\%$$

M-47 WEAPON ANALYSIS

PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	$\alpha \times A_T \times$ I.P. (12)	$AP_f \times \alpha \times A_T \times$ I.P. (25×26)
14	15	16	17	18	19	20	21	22	23	24	25	26	27

WEAPON ANALYSIS

PENETRATION	DUDS	CHANCE	IGNITION	ZONE	HEIGHT	SIZE	SHAPE	PARTITIONS	MULTI-STORY	A (5)	AP_f	$\alpha \times A_T \times$ I.P. (12)	$AP_f \times \alpha \times A_T \times$ I.P. (39×40)
28	29	30	31	32	33	34	35	36	37	38	39	40	41

JOINT TARGET GROUP - WASHINGTON, D.C.

Sheet No. 90.13-1545-TI/1
Date 21 Feb. 1945
Page No. 2 (6 pages)

TARGET INFORMATION SHEET *(Contd.)*

CONSTRUCTION & VULNERABILITY

The primary objectives lie within a 1300-foot radius of the NE corner of building 26a, the recommended aiming point for a high level attack.

(Refer to Illustration No. 90.13-1545 P3, P5, and P6).

	PRIMARY OBJECTIVES	WHOLE TARGET
Area of Buildings	2,125,000 square feet	3,350,000 square feet
Construction Type	54% medium span, exposed chord, sawtoothed roof buildings exceeding 25 feet high to the eaves. 42% short span, sawtoothed roof buildings less than 25 feet high to the eaves. 4% double pitch roofs less than 20 feet high to the eaves. All buildings steel framed.	35% steel framed, medium span buildings exceeding 25 feet high to the eaves. 34% steel frame, short to medium span buildings, less than 25 feet high to the eaves. 29% wood frame, short to medium span buildings. 2% short span, reinforced concrete framed buildings.
Roofs	All light weight, non-combustible sheet roofing over exposed framing.	69% light weight, non-combustible, sheet roofing over exposed steel. 29% combustible roofs. 2% resistant, reinforced concrete 4 to 6 inches thick.
Floors	Generally fire resistant.	
Number of Stories	All single story	97% single story 3% multi-story
Number of Fire Divisions	11 in 11 buildings	58 in 117 buildings

The Fire Susceptibility Plan indicates the vulnerability to fire of each building and its contents. Contents, with the exception of administration and storage units, are of slight combustibility (i.e., average industrial fire occupancy). It is estimated that 32 per cent of the plant's productive capacity can be destroyed by fire.

WEAPON RECOMMENDATIONS

The most effective weapons for a high level attack on this target are a combination of the following:

AN-M66 2000-lb G.P., fuzed 0.01 sec. nose/0.01 sec. tail (if M139 nose fuzes are unavailable, 0.1 sec. delay nose fuzes are recommended).
AN-M69 6-lb incendiary (in M18 aimable clusters).

Blast will cause the maximum damage in the relatively high, medium span aircraft assembly-type buildings. The 2000-lb bomb provides the necessary charge weight (1117 lbs TNT) to initiate structural collapse either by direct hit or near miss. Bombs fuzed to explode 5 to 10 feet beneath the roof will produce maximum damage to the contents as well as the structure. The 1000-lb G.P., weight for weight, is 95 per cent as effective against this target as the 2000-lb bomb; the 500-lb bomb is 85 per cent as effective.

Holders of JTG Folders should insert this sheet in Air Target System Folders Japanese Aircraft in place of sheet No. 90.13-1545-TI.

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

TARGET INFORMATION SHEET *(Contd.)*

The combustible portion of the contents is well dispersed, requiring multiple hits for maximum fire damage. The majority of the buildings are non-combustible (exposed steel trusses and columns, subject to structural fire damage). Ninety-eight per cent of the roofs are either lightweight non-combustible corrugated sheeting or fairly light combustible material. Thus, the AN-M69 is recommended as the most effective incendiary. A detailed analysis of each building indicates that the AN-M69 will be approximately 15 per cent more effective than the AN-M50 4-lb bomb, the alternate incendiary weapon. Fire damage also may be expected from the effects of high explosive bombs.

The following Loading Table shows the per cent of serious damage to the target which can be expected for different weights of attack and different accuracies of bombing. Accuracy is measured by the per cent of bombs dispatched expected to fall within 1000 feet of the recommended aiming point. Allowance has been made in the table for the fact that the whole target lies within a circle of 1700 feet radius. (Reference should be made to Joint Target Group Memorandum No. 3, "Explanation of Weapon Recommendations and Loading Tables Given in Target Information Sheets", dated 27 December 1944).

Table I

LOADING TABLE - MOST EFFECTIVE WEAPONS (1)

HE: AN-M66 2000-lb G.P., fuzed 0.01 sec. nose/0.01 sec. tail (if M139 nose fuzes unavailable, 0.1 sec. nose delay is recommended).

IB: AN-M69 6-lb (in M18 aimable clusters)

NAKAJIMA AIRCRAFT, KOIZUMI PLANT

Total Load in Tons (4)	Per cent of bombs dispatched expected to fall within 1000 feet of the aiming point (2)											
	10%			15%			20%			30%		
	H. E.	I. B.	F	H. E.	I. B.	F	H. E.	I. B.	F	H. E.	I. B.	F
75							25	50	15%	20	55	17%
100				30	70	16%	25	75	19	20	80	22
150	40	110	17%	30	120	22	25	125	24	35	115	27
200	40	160	21	30	170	25	60	140	28	85	115	31
300	70	230	26	130	170	31	160	140	35	185	115	40
400	170	230	31	230	170	37	260	140	41	285	115	47
500	270	230	35	330	170	42	360	140	47	385	115	54
600	370	230	39	430	170	47	460	140	52	485	115	59
700	470	230	43	530	170	51	560	140	57	585	115	64
800	570	230	46	630	170	55	660	140	61	685	115	68
900	670	230	50	730	170	59	760	140	65	785	115	72

NOTES:

(1) The 1000-lb G.P. is 95 cent as effective against this target as the 2000-lb bomb; the 500-lb bomb 85 per cent. The AN-M50 is estimated to be 85 per cent as effective as the AN-M69.

(2) In the examples following this table, this quantity is called the "Index of Mission Efficiency". It is a measure of bombing accuracy, and bears no relation to the size of the target.

(3) Expected fraction (per cent) of structural damage to the target. Allowance has been made for the fact that this whole target lies within a circle of 1700 feet radius.

(4) Load is given in tons of actual (not nominal) weight of bombs.

Holders of JTG Folders should insert this sheet in Air Target System Folder Japanese Aircraft in place of sheet No. 90.13-1545-TI

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

Method of Use:

1. Determine Index of Mission Efficiency:

   (a) Estimate per cent of dispatched planes bombing primary target.
   (b) Estimate per cent of bombs over target expected to fall within 1000 feet of aiming point.
   (c) Multiply (a) by (b) and round off to nearest percentage figure in table.

2. Read under computed Index of Mission Efficiency and opposite the total load dispatched the recommended high explosive - incendiary loading and the expected per cent of damage.

Examples Illustrating Use of Loading Table:

1. To find the best HE-IB combination and resulting per cent of damage for a given force:

   Given: Planes expected to bomb primary target, 70 per cent of mission. Per cent of bombs over target, expected to fall within 1000 feet of aiming point, 30 per cent. Mission of 100 planes with total load of 400 tons.

   Solution: 70 per cent x 30 per cent equals 21 per cent; i.e., 20 per cent is Index of Mission Efficiency. Opposite 400 tons in 20 per cent columm find loading:
   HE 260 tons equals 65 plane loads at 4 tons per plane
   IB 140 tons equals 35 plane loads at 4 tons per plane
   Fraction of damage: 41 per cent.
   Hence, for optimum loading 65 planes will carry HE and 35 planes IB, but if groups of 12 are to carry only one kind of bomb per group, this may be revised to 5 groups of HE and 3 groups of IB.

2. To find force required to achieve recommended level of damage:

   Given: Recommended level of damage, 50 per cent. Same Index of Mission Efficiency as in Example 1. Individual A/C bomb load 4 tons.

   Solution: In 20 per cent Mission Efficiency column take:
   F equals 52 per cent and find loading:
   HE 460 tons
   IB 140 tons
   Total 600 tons
   requiring a total force of 150 A/C or 13 groups of 12 A/C.

The Loading Table has been prepared from an analysis of the target before attack. If the important buildings of the target have suffered only slight damage in previous attacks, this table still can be used for determining the best loading. However, after substantial damage to the important buildings has resulted, a new analysis of the target should be made and a new Loading Table prepared.

If the target has suffered substantial damage in earlier attacks, and no new Loading Table is available, the following general rules can be applied:

a. If previous attacks have destroyed most of the important combustible buildings (or buildings with highly combustible contents) on the site, as indicated in the Fire Susceptibility Plan, Illustration No. 90.13-1545 P5, loads carried on subsequent attacks should consist wholly of the recommended HE weapon.

Holders of JTG Folders should insert this sheet in Air Target System Folder Japanese Aircraft in place of sheet No. 90.13-1545-TI.

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

Holders of JTG Folders should insert this sheet in Air Target System Folder under Japanese Aircraft in place of sheet No. 90.13-1545-TI.

b. If the proportion of combustible buildings remaining is about the same as before attack (because the bomb pattern has covered only part of the site), the original Loading Table may again be used to calculate the best mixture of HE and IB for a subsequent attack.

c. If it has not been possible to assess damage in the earlier attack, the Loading Table should be used to determine the cumulative load. For example, if 300 tons have previously been dispatched, and 200 tons are to be sent in a second attack, and the Index of Mission Efficiency is 20 per cent, the Loading Table indicates that the cumulative load of 500 tons should be divided 360 tons of HE and 140 tons of IB. If 160 tons of HE and 140 tons of IB were dispatched in the first attack, 200 tons of HE and no IB should be sent in the second.

LEVEL OF DAMAGE

Serious damage (structural plus severe internal fire damage) of the following approximate levels will result in the net production losses shown below:

Fraction of Serious Damage	Months of Net Loss
20 per cent	1 month
30-40 per cent	2-4 months
50 per cent	5-6 months

The 50 per cent level is desirable, particularly in sub-assembly sections, as it will destroy or warp a considerable proportion of the highly specialized assembly jigs. This level also will destroy a high percentage of the material in production as well as heavily damaging vital machinery in sections of the plant other than sub-assembly.

At lesser levels of damage, production loss is not as certain but will depend upon the extent to which vital processes are struck. Moreover, the plant will have a great opportunity to effectively use duplicative and undamaged jigs and machinery or to disperse equipment. Damage of less than 20 per cent can usually be repaired rather quickly and does not normally result in serious production loss.

The total tonnage which must be dispatched to cause these levels of damage may be estimated from the Loading Table.

CAMOUFLAGE, DECOYS AND SMOKE SCREENS

Photography of 9 February 1945 shows all major buildings camouflaged with disruptive paint. A few of the small buildings are not camouflaged.

ADDITIONAL INFORMATION

Among the planes believed to have been assembled at this location are:

1. Type 0 fighter ZEKE.
   a. With SAKAE engines 21 and 31 series supplied by the Nakajima Aircraft, Musashino-Tama (Musashi) plant. (TARGET 90.17-357).
   b. With wing tips supplied by Nakajima's Kumagaya plant (TARGET 90.13-1550).
   c. With ailerons and flaps manufactured by Nippon Kentetsu Kogyo.

2. Torpedo bomber JILL, Model 12.
   a. With KASEI 25 engines supplied by Mitsubishi Aircraft Engine Works, Nagoya (TARGET 90.20-193).

3. Type 2 two engined reconnaissance-fighter IRVING.
   a. With SAKAE 21 engines supplied by the Nakajima Aircraft, Musashino-Tama (Musashi) plant (TARGET 90.17-357).
   b. With SAKAE 21 engines supplied by the Ishikawajima Engine Plant, Tomioka (TARGET 90.17-1391).

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

JOINT TARGET GROUP - WASHINGTON, D.C.

Sheet No. 90.13-1545-TI/1
Date 21 Feb. 1945
Page No. 6 (6 pages)

TARGET INFORMATION SHEET *(Contd.)*

4. Type 2 four engined bomber LIZ or successor.
   a. With MAMORU 11 engine supplied by Nakajima Aircraft, Musashino-Tama (Musashi) plant (TARGET 90.17-357).

5. Two engine bomber FRANCES.
   a. With HOMARE 11 engine supplied by Nakajima Aircraft, Musashino-Tama (Musashi) plant (TARGET 90.17-357).
   b. With KASEI 25 engine supplied by Mitsubishi Aircraft Engine Works, Nagoya (TARGET 90.20-193).

6. Single engined reconnaissance MYRT.
   a. With HOMARE 21 engine supplied by Nakajima Aircraft, Musashino-Tama (Musashi) plant (TARGET 90.17-357).

Several new types are also believed to be in production on a limited scale.

Dispersal: (Refer to Illustration No. 90.13-1545 P3, P5, and P6).

Reconnaissance photography of 9 February 1945, indicates that large-scale dispersal is probably already underway, although no bombing attacks had been directed to the plant as of that date. The removal and/or dismantling of 23 buildings with an approximate roof coverage of 450,000 square feet - almost 15 per cent of the total building area is reported to be in progress. Although most of the buildings removed to date have been identified as storage, the dismantling of more important buildings and the dispersal of important production processes may be contemplated. Cabled reports from the field indicate that the buildings removed or dismantled are: 1, 2, 12b, (partially), 11b (partially), 13b, 14b, 15, 19c, 20 (partially), 22 (partially), 21a, 25b (partially), 30b, 31b, 31c, 35a (partially), 43, 49, 56, 53, 54a (partially). Two other small buildings, not shown on the Illustrations have also been removed.

Holders of JTG Folders should insert this sheet in Air Target System Folder Japanese Aircraft in place of sheet No. 90.13-1545-TI.

(P)

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

Building No.	I.P.	Fraction of Serious Damage	Number of Hits 500-lb GP	1000-lb GP	2000-lb GP
13a	5	30%	10	4	2
		50%	19	8	4
		70%	29	12	5
31a	4	30%	9	4	2
		50%	17	7	3
		70%	26	11	5
22	3	30%	12	7	3
		50%	24	14	6
		70%	36	21	10
31c	2	30%	6	3	2
		50%	11	6	3
		70%	17	10	4
24	1	30%	4	2	1
		50%	8	5	2
		70%	12	7	3

Examples of Use of Table I:

1. **Problem:** To obtain the required number of hits with 500-lb GP bombs on Building 30a to achieve 30 percent serious damage.
   Solution: The table gives 25 hits as the number required to achieve 30 percent serious damage.

2. **Problem:** To obtain the required number of hits with 2000-lb GP bombs on Building 11a to achieve 60 percent serious damage.
   Solution: The table gives 8 hits for 50 percent and 11 hits for 70 percent serious damage. By interpolation 10 hits are required for 60 percent serious damage.

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

NOT TO BE TAKEN INTO AIR

CONFIDENTIAL

JOINT TARGET GROUP, WASHINGTON, D.C.

TARGET INFORMATION SHEET

ANNEX 1

Sheet No. 90.13-1545-TI/1-A
Date 21 Feb. 1945
Page No. 1 (2 pages)

Obj. Folder 90.12, 13
Obj. Area 90.13
AAF Target No. 90.13-1545

Place Koizumi (Japan)
Air Target System Aircraft

Lat.: 36°15'N
Long: 139°25'E
Alt.: 125 feet

NAME OF TARGET - NAKAJIMA AIRCRAFT, KOIZUMI PLANT
(Nakajima Hikoki K.K., Koizumi Seisakusho)

(Note: This annex is issued for use by the Navy in conjunction with Target Information Sheet 90.13-1545 TI/1, dated by the Joint Target Group on 21 Feb. 1945,)

ALL PREVIOUS SHEETS CANCELLED

NAVAL CARRIER-BASED AIR ATTACK

Introduction: This sheet is for the use of Naval carrier-based aircraft which are better adapted for attacking the important individual buildings rather than the target as a whole. In view of the complexities involved in estimating bombing accuracies and stowage capabilities of carrier-based aircraft, this discussion is limited to stating the number of hits with various bombs required to achieve given levels of damage on individual buildings. No attempt is made to convert these to number of bombs or planes to be dispatched.

Buildings and Their Importance to Production: Only those buildings rated as "Primary" or "Secondary" on the Fire Susceptibility Plan, Illustration No. 90.13-1545 P5, are taken into consideration; other buildings are of minor productive value and do not merit specific attack. The buildings are listed in Table I below in the order of their importance to production, the relative value of which is indicated by the numbers in the column headed "I.P." (Index of Importance to Production). These indices, based on a scale 10 to 1 (buildings rated 10 being of greatest importance), refer to this target only and should not be used to compare buildings in different targets.

Number of Hits: Table I below gives the number of hits by various HE bombs to achieve 30, 50, and 70 percent serious damage to specific buildings. For other levels of damage within this range, the required number of hits can be obtained by interpolation.

Table I

Number of Hits Required to Achieve 30, 50 and 70 Percent Serious Damage to Individual Buildings
(Refer to Illustration No. 90.13-1545 P5)

Building No.	I.P.	Fraction of Serious Damage	Number of Hits 500-lb GP	1000-lb GP	2000-lb GP
11a	10	30%	21	9	4
		50%	41	17	8
		70%	61	26	11
26a	10	30%	28	16	8
		50%	55	32	16
		70%	81	48	23
30a	9	30%	25	15	7
		50%	49	29	14
		70%	73	43	21
25a	7	30%	21	13	6
		50%	42	25	12
		70%	62	36	17
12a	5	30%	11	5	2
		50%	22	9	4
		70%	32	14	6
14a	5	30%	8	3	1
		50%	15	6	3
		70%	22	9	4

Holders of JTG Folders should insert this sheet in Air Target System Folder Japanese Aircraft with corresponding target material.

CONFIDENTIAL

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

JOINT TARGET GROUP - WASHINGTON, D. C

NAKAJIMA AIRCRAFT CO.

KOIZUMI JAPAN

TARGET NO. 90.13-1545

APPROX. COORDINATES 36°15′ NORTH 139°25′ EAST

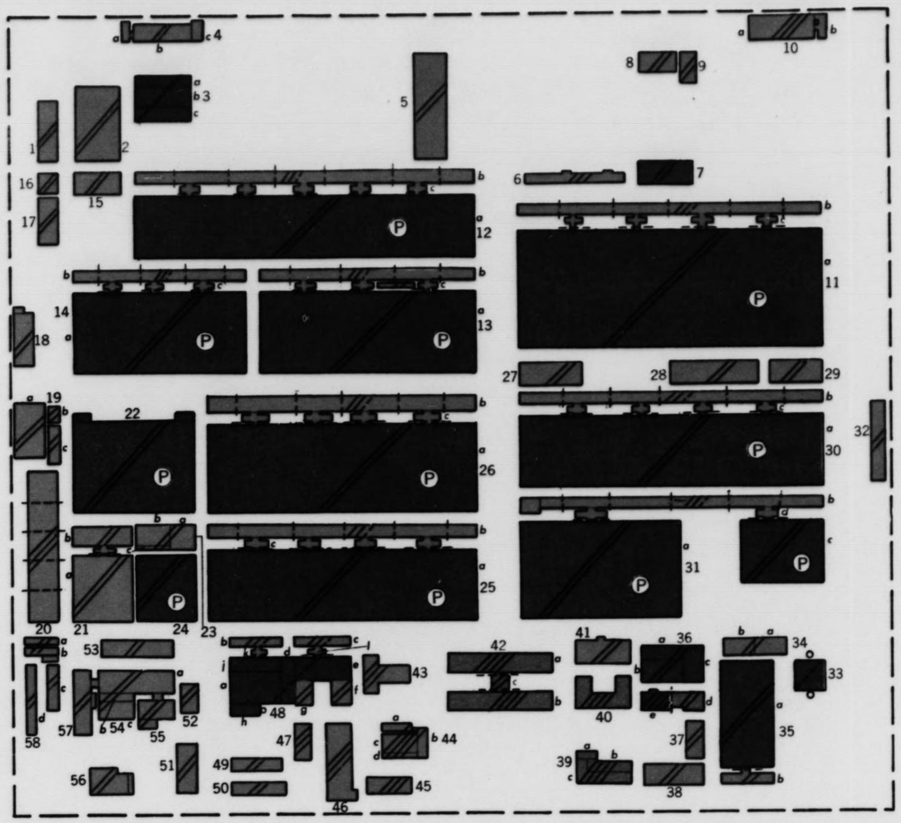
PHOTOGRAPHED 7 NOVEMBER 1944

500 0 1:6,000 500 1000 FEET

ILLUSTRATION NO. 90.13-1545-P5

ISSUED JANUARY 1945

CONFIDENTIAL



FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS	(P)	FIRE WALL, CERTAIN	
SECONDARY BUILDINGS	(S)	FIRE WALL, PROBABLE	

BUILDINGS		CONTENTS	
COMBUSTIBLE		NON-COMBUSTIBLE	
NON-COMBUSTIBLE		SLIGHTLY COMBUSTIBLE	
FIRE RESISTANT		MODERATELY COMBUSTIBLE	
COMBINATION I.E. COMBUSTIBLE ROOF RESISTANT FLOORS		HIGHLY COMBUSTIBLE	
		EXTREMELY COMBUSTIBLE	
WATER TANK	(W)	INTERMEDIATE VALUES	

AREA IN SQ. FT.	PRIMARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	11	58
NO. OF FIRE DIVISIONS	11	117
PLAN AREA	2,125,000	3,350,000
TOTAL FLOOR AREA	2,125,000	3,500,000
SITE AREA	7,875,000	

PREPARED BY AERONAUTICAL CHART SERVICE, AAF.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE, A.A.F., BY COMBINED PERSONNEL OF U.S. AND BRITISH SERVICES FOR THE USE OF ALLIED FORCES

NOT TO BE TAKEN INTO THE AIR

TARGET NO. 90.13-1545

APPROX. COORDINATES 36° 15' N 139° 25' E

PHOTOGRAPHED 7 NOVEMBER 1944

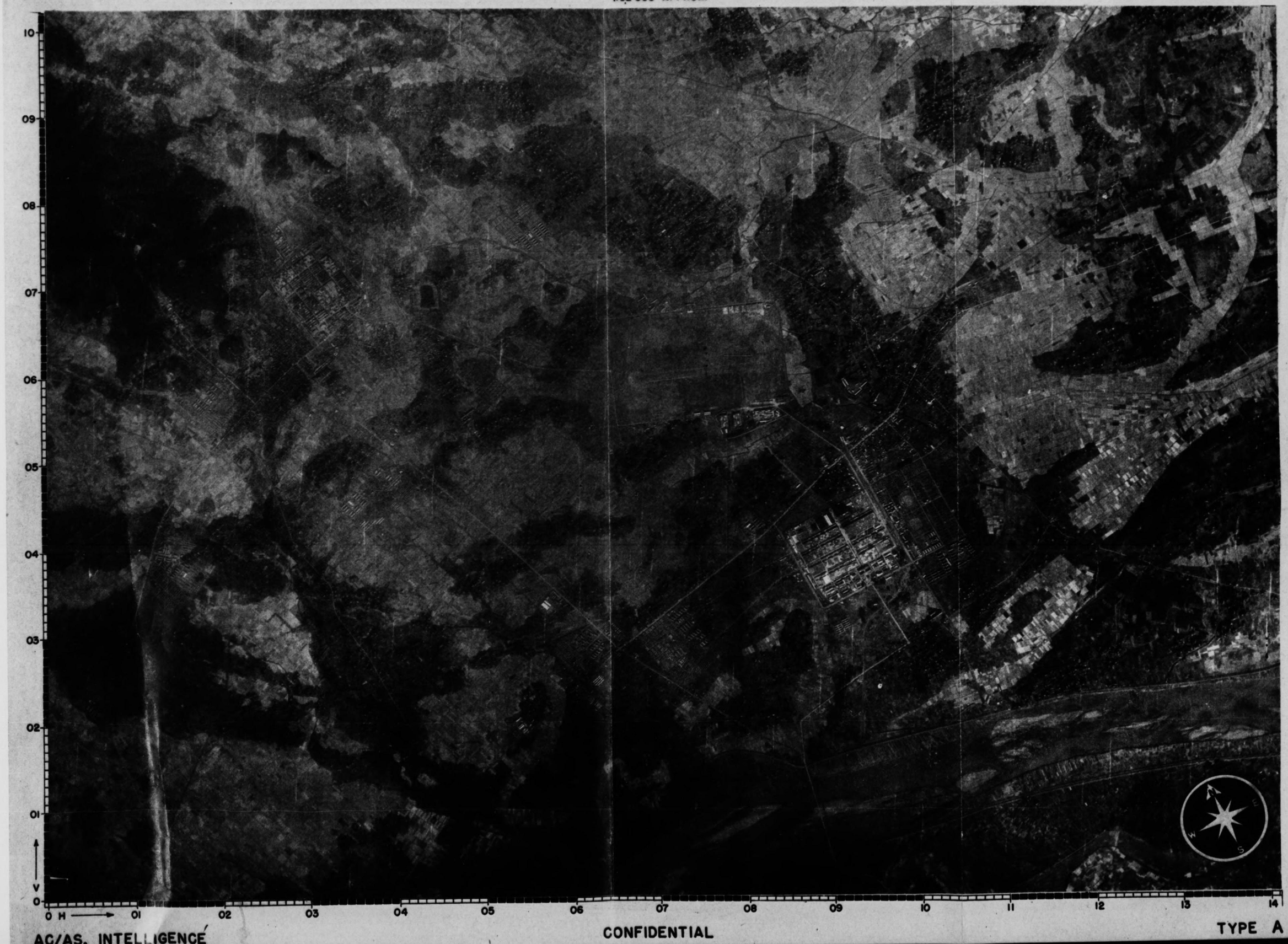
NAKAJIMA AIRCRAFT — KOIZUMI PLANT
TAKASAKI AREA, JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

ILLUSTRATION NO. 90.13-1545 PI

ISSUED NOVEMBER 1944

CONFIDENTIAL



AC/AS, INTELLIGENCE

CONFIDENTIAL

TYPE A

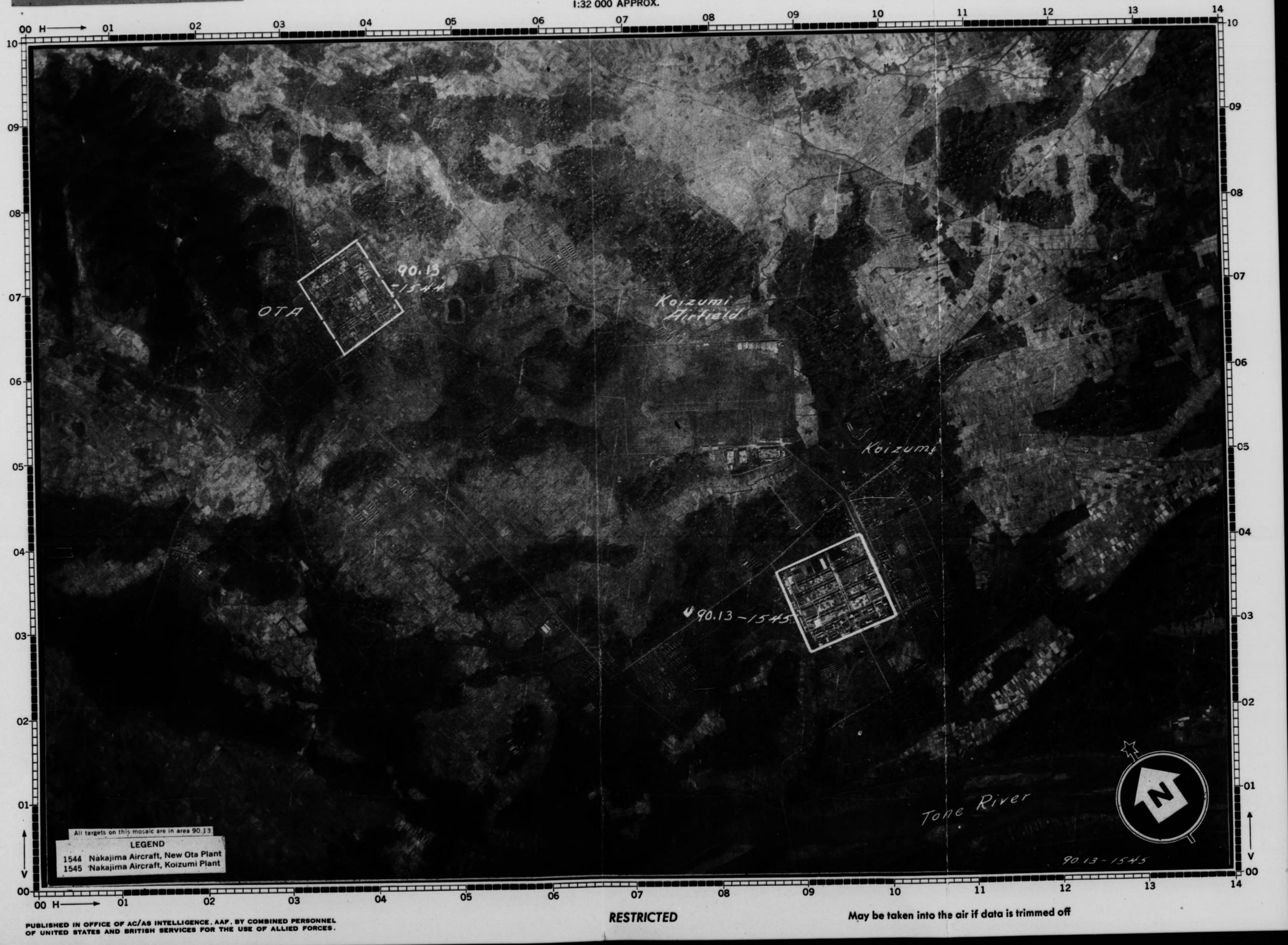
JOINT TARGET GROUP
WASHINGTON, D. C.

NAKAJIMA AIRCRAFT, KOIZUMI PLANT
KOIZUMI · JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

RESTRICTED

ILLUSTRATION No. 90.13-1545 P2/1
DATE.....29 April 1945
TARGET No.....90.13-1545
COORDINATES...36°15'N 139°25'E
PHOTOGRAPHED.7 November 1944



All targets on this mosaic are in area 90.13

LEGEND
1544 Nakajima Aircraft, New Ota Plant
1545 Nakajima Aircraft, Koizumi Plant

Holders of Joint Target Group Folders should insert this sheet in Air Target System Folder: Japanese Aircraft in place of 90.13-1545 P2.

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE, AAF, BY COMBINED PERSONNEL OF UNITED STATES AND BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

May be taken into the air if data is trimmed off

JOINT TARGET GROUP • WASHINGTON, D. C.

NAKAJIMA AIRCRAFT, KOIZUMI PLANT
KOIZUMI, JAPAN

TARGET No. 90.13–1545

COORDINATES 36° 15′ N 139° 25′ E

PHOTOGRAPHED 7 NOVEMBER 1944

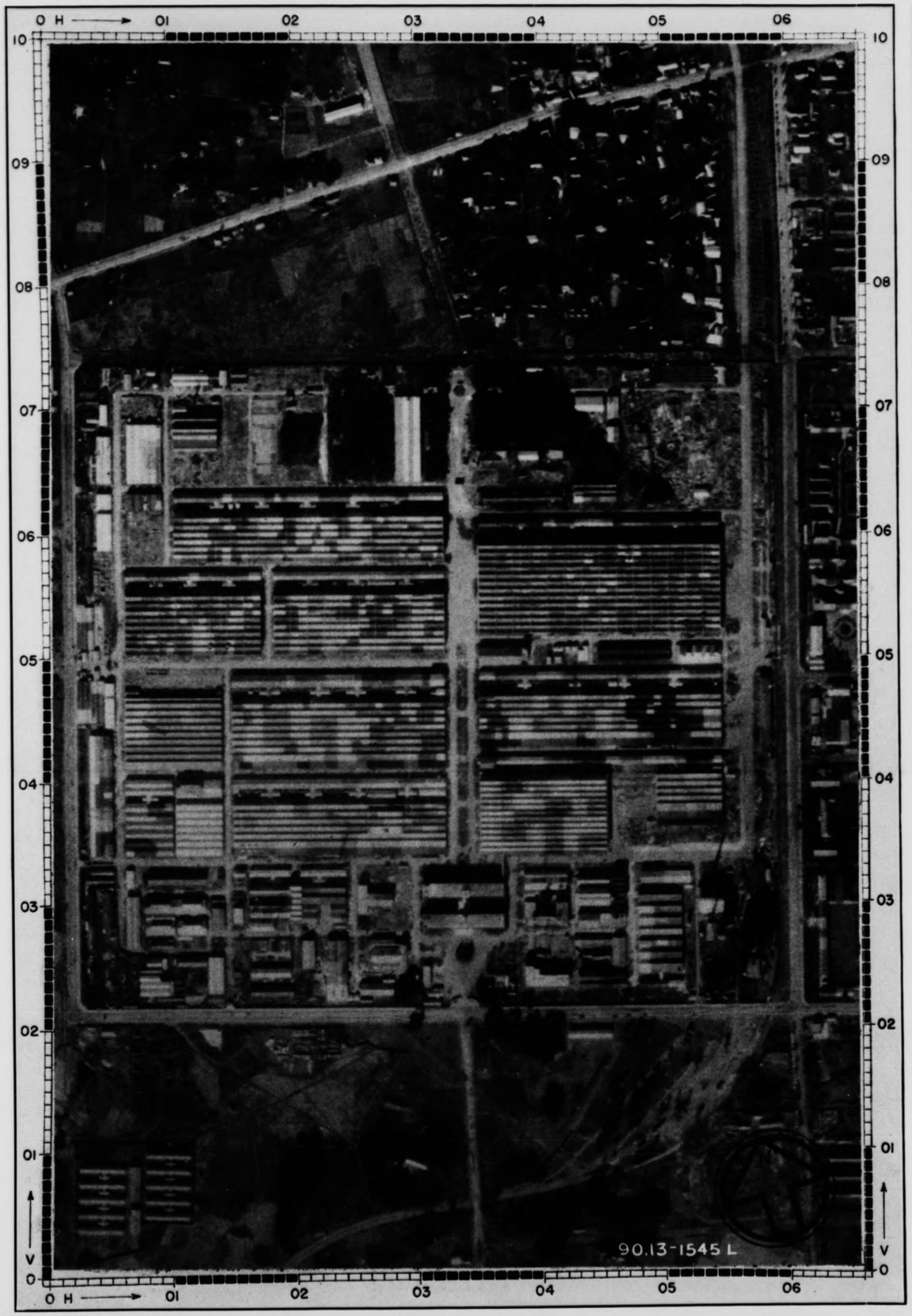
0 500 1000 1500 2000 2500 3000 FEET

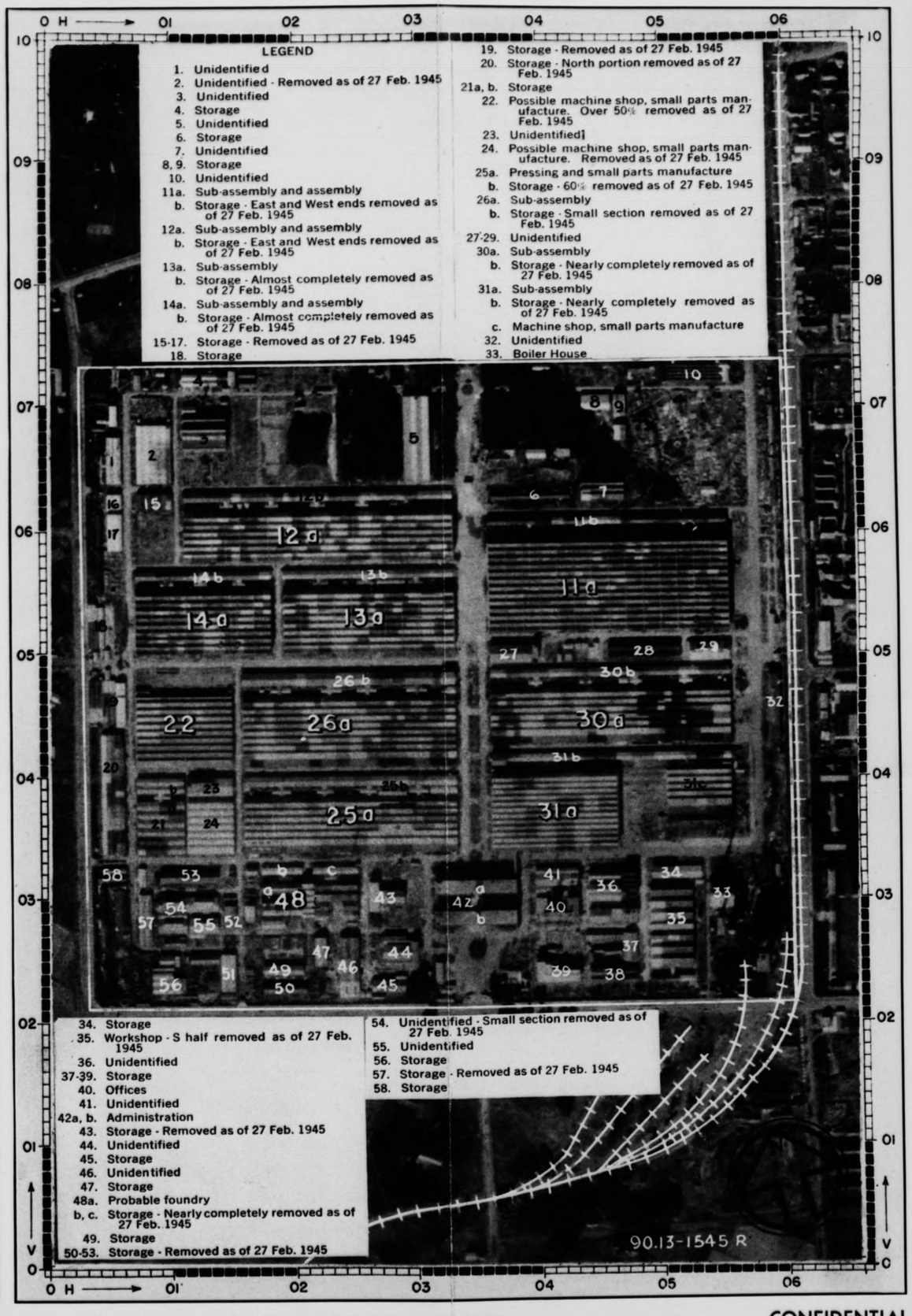
0 1/4 1:6000 APPROX. 1/2 MILE

ILLUSTRATION No. 90.13–1545 P3/1

DATE 26 APRIL 1945

CONFIDENTIAL





HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT IN PLACE OF SHEET 90.13—1545 P3.

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE, A. A. F., BY COMBINED PERSONNEL OF UNITED STATES AND BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

UNANNOTATED HALF MAY BE TAKEN INTO THE AIR IF DATA IS TRIMMED OFF, ANNOTATED HALF IS NOT TO BE TAKEN INTO THE AIR.

CONFIDENTIAL

TARGET NO. 90.13-1545

APPROX. COORDINATES 36°15′ NORTH 139°25′ EAST

PHOTOGRAPHED 7 NOVEMBER 1944

JOINT TARGET GROUP - WASHINGTON, D. C

NAKAJIMA AIRCRAFT CO.

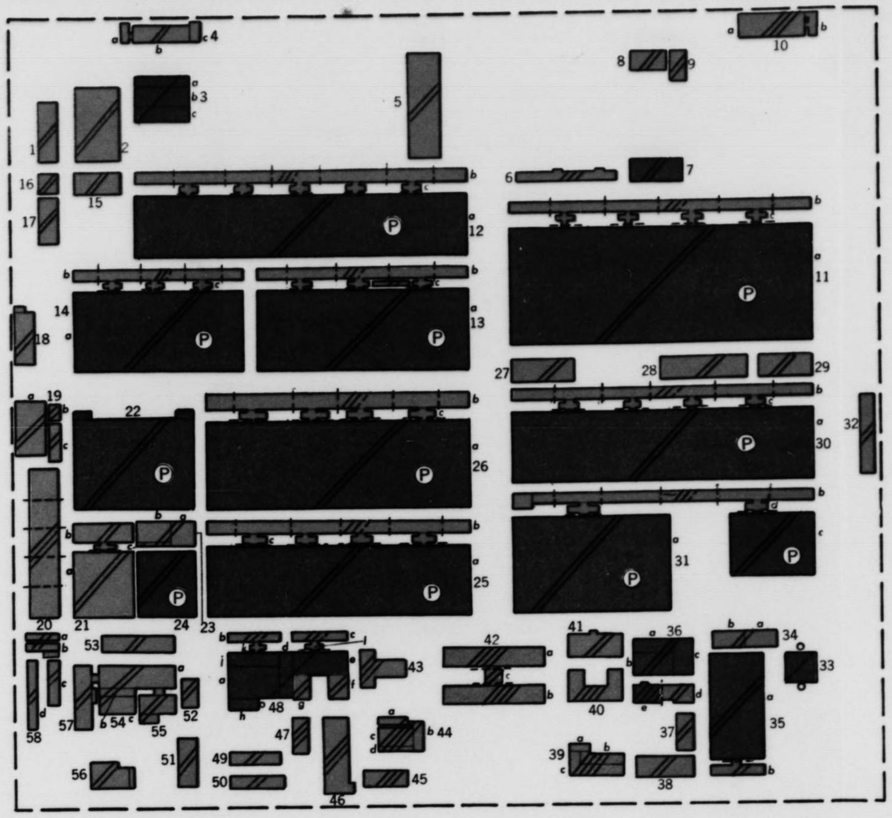
KOIZUMI JAPAN

500 0 1:6,000 500 1000 FEET

ILLUSTRATION NO. 90.13-1545-P5

ISSUED JANUARY 1945

CONFIDENTIAL



WORKERS QUARTERS AND RECREATION AREA

FIRE SUSCEPTIBILITY PLAN

PRIMARY BUILDINGS	(P)	FIRE WALL, CERTAIN	
SECONDARY BUILDINGS	(S)	FIRE WALL, PROBABLE	

BUILDINGS		CONTENTS	
COMBUSTIBLE		NON-COMBUSTIBLE	
NON-COMBUSTIBLE		SLIGHTLY COMBUSTIBLE	
FIRE RESISTANT		MODERATELY COMBUSTIBLE	
COMBINATION I.E. COMBUSTIBLE ROOF RESISTANT FLOORS		HIGHLY COMBUSTIBLE	
		EXTREMELY COMBUSTIBLE	
WATER TANK	(W)	INTERMEDIATE VALUES	

AREA IN SQ. FT.	PRIMARY	ALL BLDGS. SHOWN
NO. OF BUILDINGS	11	58
NO. OF FIRE DIVISIONS	11	117
PLAN AREA	2,125,000	3,350,000
TOTAL FLOOR AREA	2,125,000	3,500,000
SITE AREA	7,875,000	

PREPARED BY AERONAUTICAL CHART SERVICE, AAF.

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE, A.A.F.,
BY COMBINED PERSONNEL OF U.S. AND BRITISH SERVICES
FOR THE USE OF ALLIED FORCES

JOINT TARGET GROUP, WASHINGTON, D. C.

ECONOMIC DAMAGE ASSESSMENT

NAKAJIMA AIRCRAFT, KOIZUMI PLANT

KOIZUMI . . . . . JAPAN

Sheet No.	90.13–1545–DA
Date	4 April 1945
Page No.	1
Target No.	90.13–1545
Obj. Area	90.13
Obj. Folder No.	90. 12, 90. 13
Air Target System	Aircraft
Lat.:	36°15' N
Long.:	139°25' E
Alt.:	125 Feet

ALL PREVIOUS SHEETS CANCELLED

NOTE.—The poor quality of available post attack photography limits the determination of the extent and severity of building damage and also precludes an estimate of internal destruction. This report should, therefore, be considered a preliminary estimate of economic damage. A revised report will be issued if subsequent photography reveals major differences.

PARTICULARS OF ATTACK

This plant was attacked by Navy carrier based dive bombers in the second Navy Tokyo attack of 25 February 1945. No data are at present available on bomb tonnages dropped or the number of planes attacking.

PREVIOUS REPORTS

None.

SUMMARY OF ECONOMIC DAMAGE

(1) Moderate damage was suffered by this plant. Of the almost 3 million square feet of plan area, at least 6 percent received structural damage while superficial damage was roughly twice as extensive. Damage was concentrated upon the more important production sections of the plant. Better quality photography may reveal that much of the apparent superficial damage is in fact structural.

(2) Estimates of aircraft loss are extremely tentative not only because of the poor photography but also because of insufficient ground intelligence as to the production layout and even as to the plane types being manufactured at this plant. For the plant as a whole a loss of about 6 weeks' output at the estimated preattack production rate of 455 per month appears likely. This amounts to roughly 670 planes.

The estimated aircraft production losses by types are shown in the following table:

Estimated aircraft loss from attacks on Nakajima Aircraft, Koizumi plant

Plane type	Pre-attack monthly output	Estimated aircraft loss		
		Work in process	Loss in repair	Total
Zeke	265	65	200	265
Myrt	15	4	11	15
Jill	50	15	35	50
Frances	75	60	150	210
Irving	45	35	90	125
4-engined planes	5	1	4	5
Total	455	180	490	670

(3) Aircraft loss and recuperation will not be uniform throughout the plant. The eastern half, believed to be engaged in the manufacture of multiple-engined planes, has probably suffered a production loss of more than 2 months' preattack output and will probably require at least 4 months to return to preattack production levels. The western half, thought to manufacture the plant's single-engined planes, has been less severely damaged—1 month's net loss—and could probably be back to preattack production rates within 2 to 3 months.

(4) It is not possible to estimate the extent to which this plant will be repaired. The post-strike photography was taken too soon after the strike to show any repairs. Dispersal of the plant's production may have been underway even before the attack as evidenced by the fact that approximately 500,000 square feet of building area (mostly storage-type buildings) had been removed shortly before the attack and that at least two of the planes thought to be manufactured at this plant (Jill and Myrt) may have been transferred to the firm's aircraft plant at Handa (Target 90.20–1635). On the other hand removal may have been intended merely to reduce the fire hazard by clearing away the more combustible buildings.

FUTURE TARGET VALUE

This plant still appears to have considerable target value since four-fifths of it is still intact and within 6 weeks or 2 months it could again be producing on a substantial scale. During the next month it is not likely to turn out many completed aircraft, although it may still be manufacturing parts for itself and other plants. Even if fully repaired it will probably be 3 months before this plant can return to preattack production.

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE, A. A. F., BY COMBINED PERSONNEL OF UNITED STATES AND BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

TARGET NO. 90.13-1545

APPROX. COORDINATES 36°15′ NORTH
139°25′ EAST

PHOTOGRAPHED 27 FEBRUARY 1945

JOINT TARGET GROUP - WASHINGTON, D. C.

NAKAJIMA AIRCRAFT, KOIZUMI PLANT

KOIZUMI, JAPAN

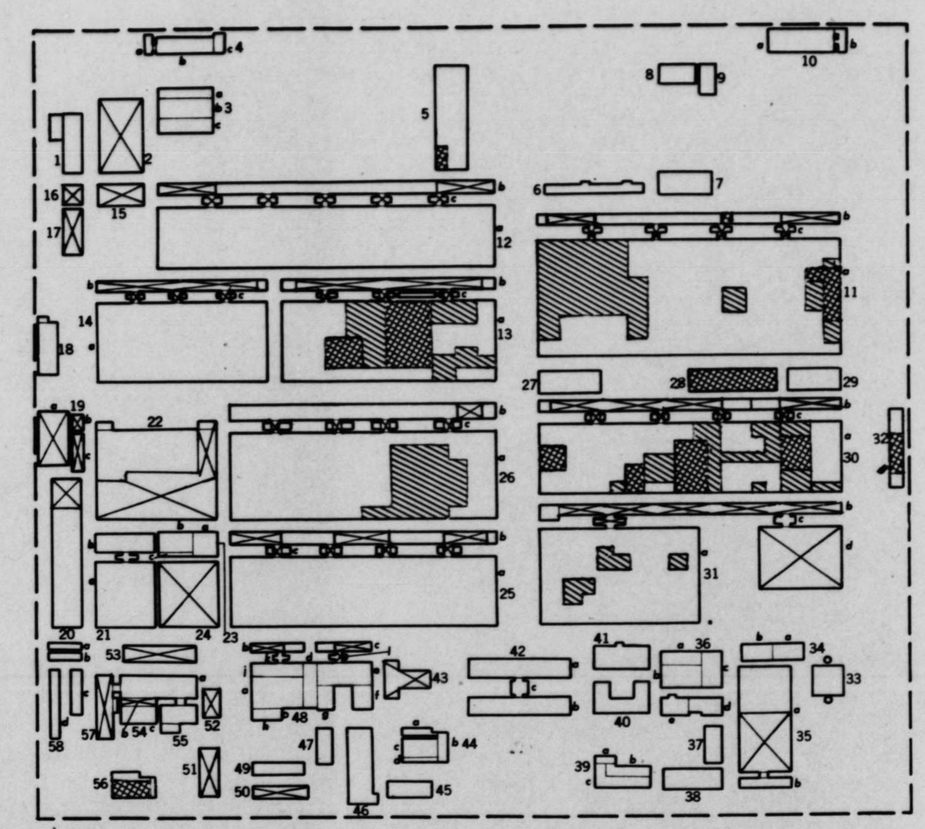
SCALE 1:6,000

500 0 500 1000 FEET

ILLUSTRATION NO. 90.13-1545-DP

ISSUED 21 APRIL 1945

CONFIDENTIAL



WORKERS QUARTERS AND RECREATION AREA

DATE OF ATTACK-24; 25 FEB. 1945

INDUSTRIAL DAMAGE PLAN

AREAS OF VISIBLE DAMAGE

STRUCTURAL DAMAGE

SUPERFICIAL DAMAGE

CIVIL REMOVAL

HOLDERS OF JTG FOLDERS SHOULD INSERT THIS SHEET IN AIR TARGET SYSTEM FOLDER: JAPANESE AIRCRAFT WITH OTHER 90.13-1545 MATERIAL

PREPARED BY AERONAUTICAL CHART SERVICE, AAF.

Published in Office of AC/AS Intelligence, A.A.F., by combined personnel of U.S. and British Services for the use of Allied Forces

NOT TO BE TAKEN INTO AIR

CONFIDENTIAL

Sheet No.90.13-1545 P6
Date 21 Feb. 1945
Page No. 1 (1 pages)

JOINT TARGET GROUP, WASHINGTON, D.C.
FUNCTIONAL IDENTIFICATION SHEET
(To be read in conjunction with Illustration No. 90.13-1545 P5)

Obj. Folder 90.12, 13
Obj. Area 90.13
AAF Target No. 90.13-1545

Place Koizumi (Japan)
Air Target System Aircraft

Lat.: 36° 15'N
Long: 139° 25'E
Alt.: 125 feet

NAME OF TARGET **NAKAJIMA AIRCRAFT, KOIZUMI PLANT**
(Nakajima Hikoki KK, Koizumi Seisakusho)

ALL PREVIOUS SHEETS CANCELLED

Building No.	Function of Building
1-3	Unidentified
4	Storage
5	Unidentified
6	Storage
7	Unidentified
8-9	Storage
10	Unidentified
11a	Sub-assembly and assembly
11b	Storage
12a	Sub-assembly and assembly
12b	Storage
13a	Sub-assembly
13b	Storage
14a	Sub-assembly and assembly
14b, 15-21b	Storage
22	Machine shop, small parts manufacture
23	Unidentified
24	Machine shop, small parts manufacture
25a	Pressing and small parts manufacture
25b	Storage
26a	Sub-assembly
26b	Storage
27-29	Unidentified
30a	Sub-assembly
30b	Storage
31a	Sub-assembly and assembly
31b	Storage
31c	Machine shop, small parts manufacture
32	Unidentified
33	Boiler house
34	Storage
35	Workshop
36	Unidentified
37-39	Storage
40	Offices
41	Unidentified
42a, b	Administration
43	Storage
44	Unidentified
45	Storage
46	Unidentified
47	Storage
48a	Probable foundry
48b, c, 49-53	Storage
54-55	Unidentified
56-58	Storage

(Based on F/A Report No. 6, AC/AS, Intelligence, Photographic Division, dated 27 November 1944).

Holders of JTG Folders should insert this sheet in Air Target System Folder Japanese Aircraft with corresponding target material.

CONFIDENTIAL

(P)

PUBLISHED IN OFFICE OF AC/AS INTELLIGENCE,
A.A.F., BY COMBINED PERSONNEL OF U.S. AND
BRITISH SERVICES FOR THE USE OF ALLIED FORCES.

TARGET NO. 1545 NAME KOIZUMI PLANT NAKAJIMA A/P

AREA TAKASAKI LOCATION

Date	Mission No.	Field Order	D.A. Rpt.#	Photo Cover# Pre-Raid	Photo Cover# Post-Raid	REMARKS
17-18 FEB 45	NAVY STRIKE		12	3PR4M 4 3PR5M 45	3PR5M 60	529,100
3 APR 45	56		44	3PR5M45 -2 : 50-52	3PR5M140 -2 : 25-28	353,600

HEADQUARTERS XXI BOMBER COMMAND
APO 234, c/o Postmaster
San Francisco, California

BOMB LOAD RECOMMENDATIONS

Prepared by Ordnance, Chemical Warfare and Operations Analysis Sections

TARGET: 1545 (90.13), Nakajima Aircraft Plant, Koizumi

DATE: 10 February 1945

I. RECOMMENDATIONS:

a. Bombs

(1) H.E. 500 lb General Purpose
(2) I.B. 500 lb AN-M17A1 Cluster

b. Fuzing

(1) High Explosives

(a) Salvo: Nose- none; Tail- non delay
(b) Train Release: Nose- 1/10 sec delay; tail - non delay

(2) Incendiary Clusters

Set to open at 5000 ft above target

c. Percent IB to HE

(1) 40% incendiaries
(2) 60% high explosives
(3) loaded separate squadrons maintaining above percentages as near as possible

d. Method of Loading

(1) Separate squadrons, with HE loaded squadrons scheduled to hit target first.
(2) IB squadrons hit target last but immediately after last squadrons using HE

e. Dispersion of Bombs

(1) HE - 35' ground spacing
(2) IB - 25' ground spacing

II. REASONS FOR RECOMMENDATIONS:

a. 500 lb GP bombs are selected as the most effective HE weapon because:

(1) Better stowage characteristics for B-29 A/C over large sized bombs
(2) High destruction caused by numbrous expected hits on this type target
(3) Maximum tonnage per A/C cannot be carried with smaller size bombs.

b. AN-M17A1 500 lb clusters are selected as the most effective incendiary bomb because:

(1) Target, including buildings and contents is estimated to be 30% inflammable.
(2) Number of expected hits much higher than with other incendiary bombs due to 110 bombs in cluster and Area only 40% roofed covered.
(3) Chances of igniting widely dispersed inflammable material increased.
(4) M17A1 cluster is more aimable than M18 cluster.
(5) Bombs contain delay explosive heads to delay fire fighting thereby increasing chances for fire spread after bombing has ceased.

NOTE: Due to relatively large fire divisions AN-M47A2 bombs may be desirable, but are not recommended at this time due to lack of suitable stowage charactoristics pending final approval of multiple suspension.

c. Fuzings were selected because:

(1) High explosive bombs fuzed to iniate detonation by inertia tail fuzes, are believed to be passing through light weight factory roofs without being initiated. This causes bombs with delay tail fuzes to detonate below the floor level and therefore not get the full blast effect on buildings and contents.

(2) Nose fuzes are omitted in bombs to be salvoed because fuzes suitable for this type release are not available.

(3) The nose fuze will be employed to assure detonation of the bomb in the event tail fuze fails to function. 1/10 sec delay setting is the only delay setting possible with available fuzes.

d. Ratio of IB to HE: 40 to 60 ratio of IB to HE was chosen because:

(1) More damage can be expected per ton on this target using this optimum ratio.
(2) Optimum density for IB is .31 tons/acre which gives an expected damage of 23% based on 20% of dispatched load falling within 1000 ft of aiming point.
(3) Assuming that 120 A/C are dispatched and that 20% of all IB dispatched and 30% of all HE dispatched will fall within 1000' of aiming point, then expected damage is:

100% HE	-	Appx 19%
100% IB	-	Appx 25%
60-40 ratio	-	Appx 30%

III. REMARKS:

The above load is based on the following present conditions:

(1) Aircraft available.
(2) Target information.
(3) Bombs and Fuzes available.

A change of anyone of these factors prior to date of mission can change the most effective bomb load and recommendations should be changed.

W. N. DILLIN
Capt., Ord. Dept

J. W. THOMPSON
Captain, CWS

J. V. PROCTOR
Operations Analyst

(CONFIDENTIAL)

for Mr. Proctor O-A Sect.

8 February 1945.

SUBJECT: Ordnance/Chemical Warfare Information on NAKAJIMA AIRCRAFT PLANT, KOIZUMI, AAF Target No. 90.13-1545

TO : Lt. Colonel T. P. Gahan, Chemical Warfare Officer
Major H. P. Hesler, Ordnance Officer

1. Quoted below is a complete excerpt of Ordnance/Chemical Warfare information on subject target, received in a report from the Joint Target Group, AC of S, A-2, Washington, D. C., dated 27 November 1944:

WEAPON RECOMMENDATIONS

"Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such specific instructions and to assist Planners in formulating such orders the following information is given:

"A combined attack, HE and IB is recommended with HE as the major weapon. A preliminary structural analysis of the plant indicates that the following weapons would be most effective: AN M66 2000 GP bombs fuzed .1 sec nose/.01 sec tail. M47A2, 70 lb IB.

"Among the GP bombs the 2000 lb bomb gives the best expectancy of causing spreading collapse to the long-spanned and high ceilinged assembly buildings particularly if exploding near the underside of the roof.

"Since however the aircraft assembly type buildings are best destroyed by blast action alone, the AN M56 4000 LC bombs, because of its greater charge/weight ration, will be by far the most effective weapon weight for weight.

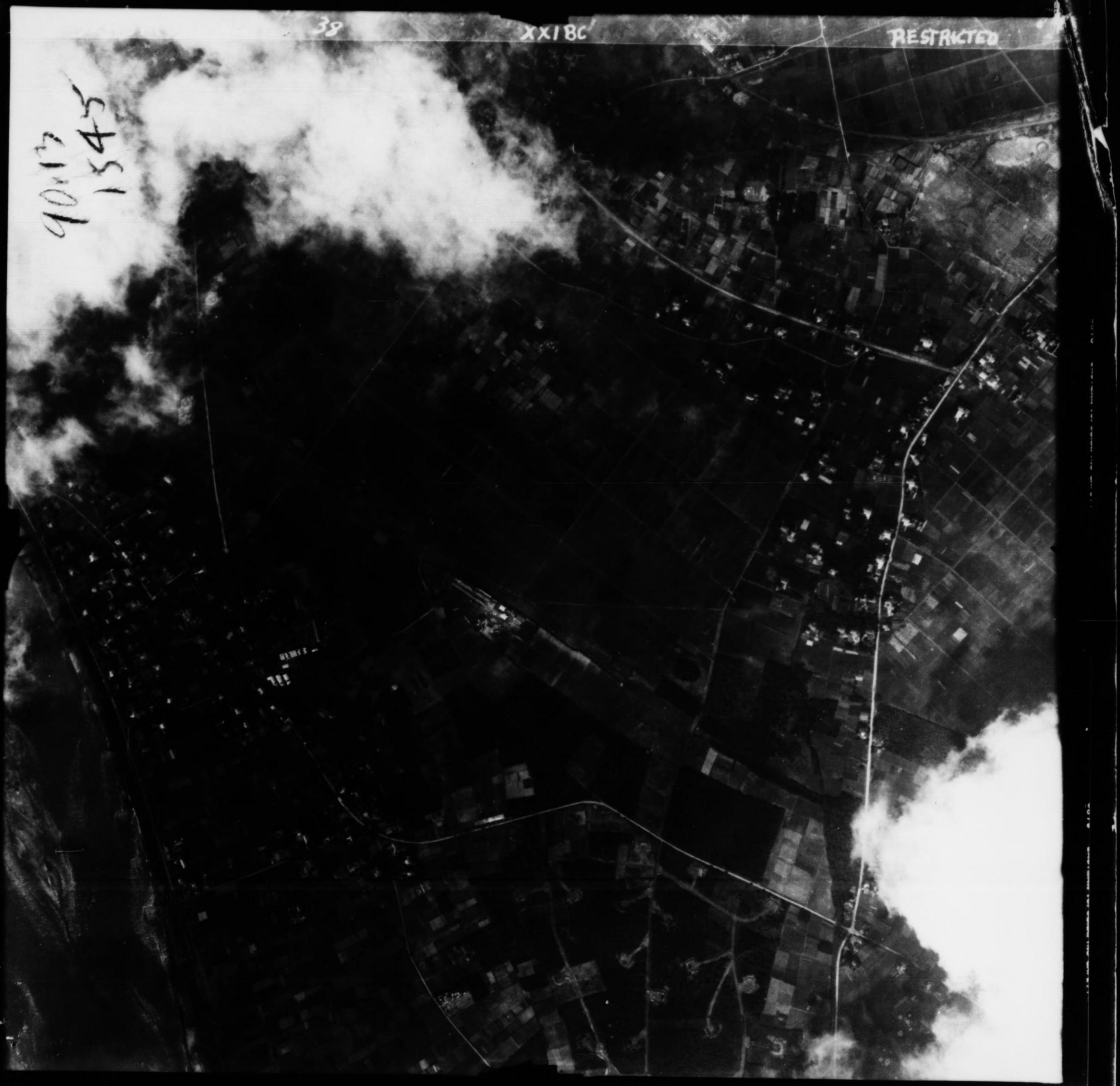
"Buildings are compact and the fire division large; thus favoring the M47.

Alternate weapons are:

AN M64 500 GP bomb fuzed .1 sec nose and 0.1 sec tail.
M17 clusters of AN M50 IB's or M18 cluster of M69 IB's.

"Roofs are of light construction permitting the use of M69."

JAMES D. GARCIA,
Colonel, Air Corps
AC of S, A-2


38
XXIBC
RESTRICTED
40-13
1545

3PR5M356-HL:

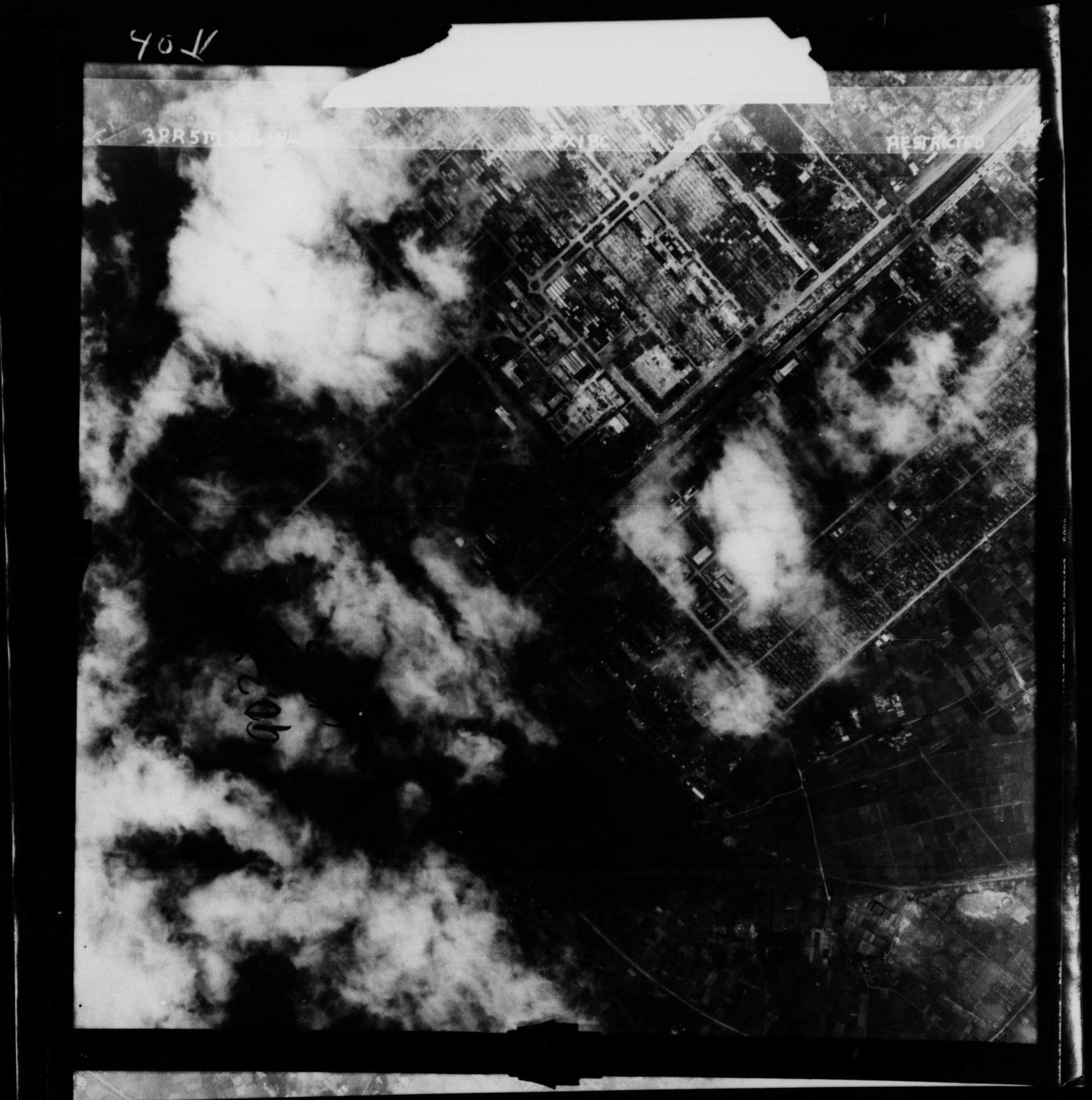
XX1BC

RESTRICTED

39

90.13
B45

40 V


3PR5T
RESTRICTED


RESTRICTED


3PR5M3Bb-HL:
XXIBC
PESTRICTED
K3

CONFIDENTIAL XXIBC3PR5M193 7MAY,1945 INTERPRON TWO-186.41

36°15'N 139°25'E TAKASAKI AREA, HONSHU 1545-NAKAJIMA A/C PLANT(KOIZUMI)

I; B; 1

Target No. 90.13-1545

NAKIJIMA AIRCRAFT CO. KOIZUMI ASSEMBLY PLANT - 36-15 N. - 139-25 E.

SUMMARY OF ATTACK DATA

DATE	SHIP	GROUP OR SQUADRON	ACA REPT NO.	WEAPONS NO.	TYPE	FUZING NOSE	FUZING TAIL
25 Feb 1945	San Jacinto			18	HVAR	-	ND
	Bunker Hill			22	250# GP	-	.025
	Essex			94	500# GP	-	.025
	Cowpens			21	1000# GP	-	.025
10 Jul 1945	Hancock	CVG-6	31	2	500# GP	VT	I
				2	HVAR	-	-

159

Study For Col. Martin AAF Board

Target #1545 Mission #56 3 April 1945

Damage inflicted by attack - from C.I.U. report N° 44
dated 18 April 1945

Total roof area of plant before attack = 3,770,000 Sq ft.
Roof area destroyed & struct. damged = 127,000 "
" " Jutted (considered struct. damage) = 226,600 "
Total roof area struct. damaged = 353,600 "
Fraction of struct. damage = 9.5%.
Type of Bomb Used - 500" G.P
Fuzing - 0.01 N - N.D.T.
Tons Dispatched - 458 tons
Tons expected to land in target = 458 x 0.80 x 0.55 = 202
Target Area = 162 A (Aiming Circle Assumed - No Info.)
Density = $\frac{202}{162}$ = 1.25 T/A
Vulnerability type of structure = V 4 MAE = 0.38 A/T
Expected Fraction of Damage = 38%
Tonnage to dispatch to obtain damage inflicted
9.5% = Density of 0.26 T/A

$$\frac{0.26 \times 202}{0.8 \times 0.55} = 120 \text{ Tons}$$

TARGET No 1545

$F_I = 1 - e^{-M^I D^I}$

D^I	F_I	αF_I
0.1	.369	.11
0.2	.600	.18
0.3	.760	.23
0.4	.842	.25
0.5	.901	.27
0.6	.937	.28
0.7	.960	.284
0.8	.974	.292
1.0	.991	.297
1.2	.995	.298

$\alpha = 30\%$

$M^I = 200{,}000$ s.f./ton = 4.6 A/T

$M = 15{,}000$ s.f./ton = .35 A/T

$F = 1 - e^{-MD}$

$A = 7{,}800{,}000$ s.f.

$A = 179$ Acres

D	F
0.2	.07
0.4	.135
0.6	.191
0.8	.245
1.0	.295
1.2	.341
1.4	.386
1.6	.428
1.8	.468
2.0	.600

Loading Factor. Weight of H.E = $\frac{520}{465}$ = 1.12

Weight of I.B = 465

Opt. Density I.B = .31 tons/acre.

Load I B = $\frac{179 \times .31}{.2}$ = 278 tons

Load H H = $\frac{179 \times .20}{.3}$ = 8120 tons

40 ships H.E. 60 ships I.B.

#1545

.390 Damage Curve

HE F	HE D	Dispatched Load	I B F	I B D	Tons Load
					340
.2 .05	.16	95	.25	.38	374
.06	.20	119	.24	.356	358
.2 .10	.32	191	.20	.242	236
.3 .15	.48	286	.15	.16	148
.4 .20	.64	382	.10	.095	85
.5 .25	.84	501	.05	.04	36
.30	1.02	609			
.35	1.26	750			
.40	1.46	870			
.45	1.68	1000			

58 planes

3 | 158 tons

62

3 | 185

140
48
92

140

120
48
72

48 A/c with I.B.

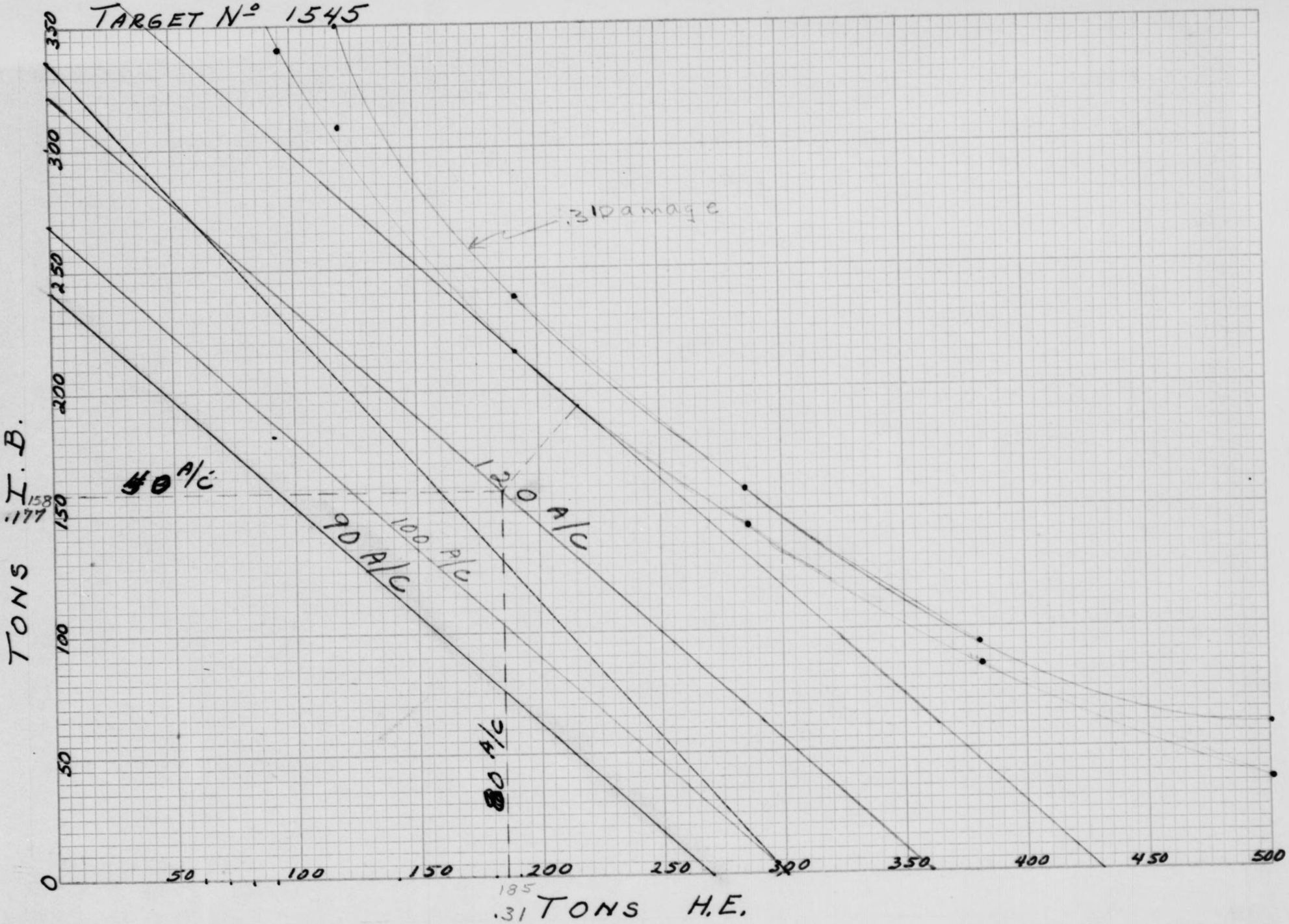
72 A/c with H.E.

48 A/c With I.B = 144

D = 144x

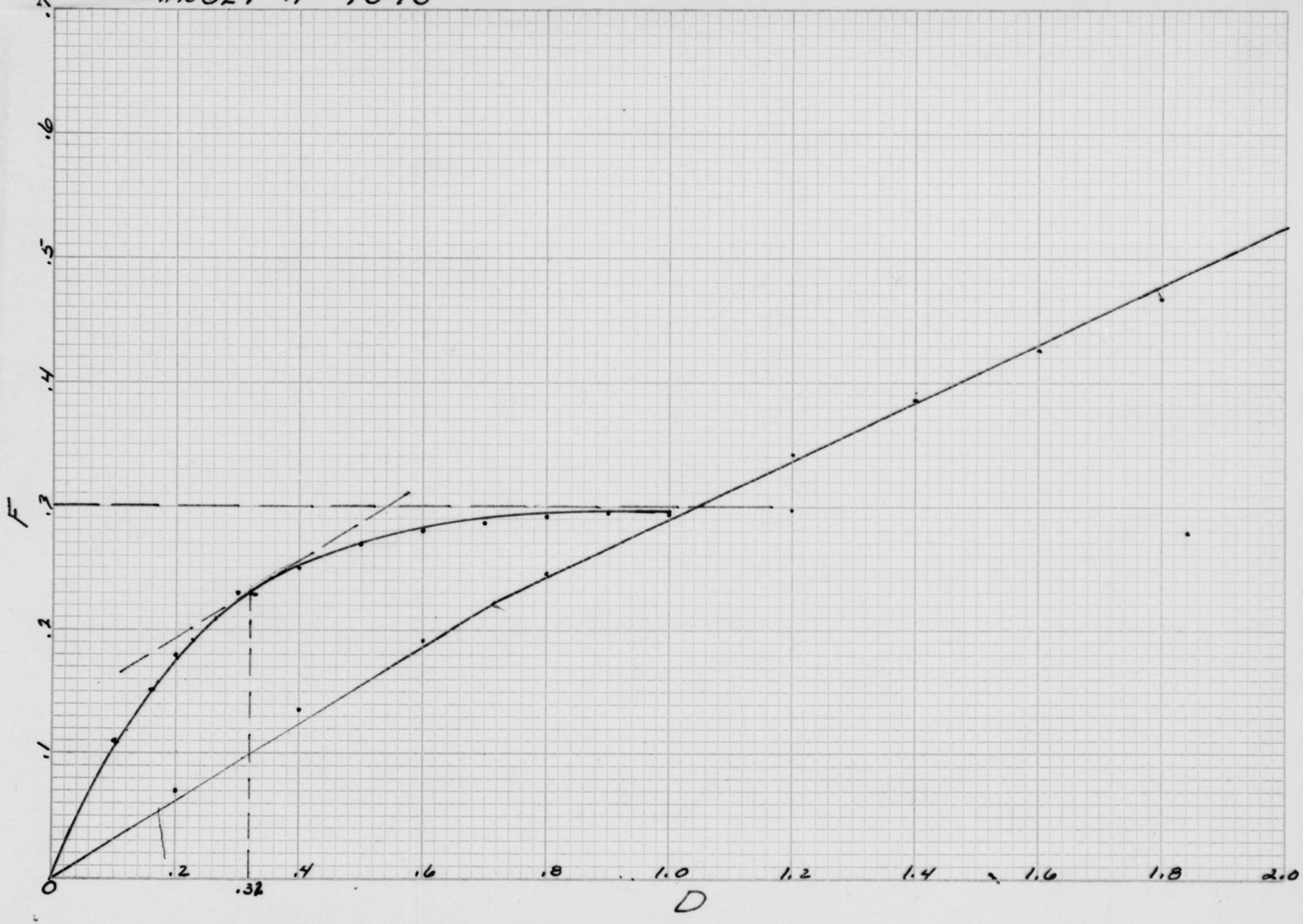
$D = \frac{144 \times .2}{179} = .160$

TARGET N° 1545



Form No. 642—10 Squares to Inch
AMERICAN PAD & PAPER CO., HOLYOKE, MASS.

TARGET Nº 1545



AF IPH-3

Mici 59071

COVER USED	
MISSION	3PR/5M 140
PRINTS	2V:25,26
DATE	13 April 1945
QUALITY	Poor
SCALE	1/16000
DATE OF ATTACK	3 April 1945

AC/AS INTELLIGENCE
PHOTOGRAPHIC DIVISION
PHOTO-INTELLIGENCE SECTION

LIMITED DAMAGE INTERPRETATION

NO. 29

CONFIDENTIAL D/P

DATE 4 May 1945

INTERPRETER Stearns

SHEET NO. 1 OF 2

AREA NO. 90.13 / TARGET NO. 1545

TARGET NAKAJIMA AIRCRAFT CO.

LOCATION Koizumi, Japan

This Limited Damage Interpretation has been undertaken in accordance with the conditions as checked below:

- [X] *Photography is inadequate in scale*
- [X] *Photography is indequate in quality*
- [ ] *Stereo coverage is lacking or incomplete*
- [ ] *Detailed interpretation is not required*
- [ ] *Damage is below 10% of built-up area*
- [ ] *Total damage is less than 50,000 sq. ft.*
- [ ] *Excessive time between attack and photography*
- [ ] *Other factors as noted below*

BUILDING			VISIBLE DAMAGE		DESCRIPTION OF DAMAGE
REF. NO.		AREA	STRUCT'L	SUPERF'L	
					The following is a status report as of 13 April. Civil removal of buildings has continued, and some damage was inflicted by the attack of 3 April. As it is not possible to differentiate between damage and dismantling in all cases, they are both carried as damage, with differentiation as far as possible in the notes. The chief sign of activity in the plant is the continued removal of buildings.
1	a	12.0			No visible damage.
	b	3.2			No visible damage.
3		23.4			No visible damage.
4	a	1.3			No visible damage
	b	8.9		2.2	Roof stripping; probably being dismantled.
	c	2.4			No visible damage
5		36.2		6.4	Area of old damage (3.2) removed. Roof stripped from an adjacent area, probably being dismantled.
6		11.9	11.9		Probably destroyed by attack of 3 April.
8-9		12.2	12.2		Probably civil removal.
10	b	2.9	2.9		Probably civil removal.
11	a	378.0			No evidence of repair of old damage (254.0) nor of additional damage. Photography, however, not clear.
	d	31.5			
12	a	171.0			No visible damage
	b	15.2	13.2		Most of remaining portion of section "b" removed; probably civil removal.
	d	32.4		16.2	Roof stripping. Probably damage from 3 Apr. attack
	e	28.3	8.7		Probably damage from 3April attack.
13		191.8			No evidence of repair of old damage (140.0) or of new damage.
14		153.1			No visible damage.
20		22.7		5.7	Roof stripped from one section. Remainder of roof is pitted with small holes.
21	a	42.0	23.3	8.5	East half of building razed. Roof stripped from one third of remaining section; roof pitted in an

TOTALS		
SITE	SITE AREA	
	BUILT-UP AREA	2384.7
	% OF SITE BUILT-UP	
DAMAGE	AREA OF DAMAGE	1108.1 (total)
	% OF BUILT-UP AREA	49.5%

APPROVED BY:

for WALTER HARRINGTON
Major, Air Corps
Chief, Evaluation Branch
Photographic Division
Office of Ass't Chief of Air Staff,
Intelligence

ALL AREAS ARE PLAN AREAS IN THOUSANDS OF SQUARE FEET

5-6122, AF

AF IPH-3A

AREA NO. / TARGET NO.	LIMITED DAMAGE INTERPRETATION	CONFIDENTIAL	D/P
90.13 / 1545	NO. 29	SHEET NO. 2 OF 2	

Ref. No.		Building Area	Visual Damage Struct'l	Visual Damage Superf'l	
21a (cont'd)					adjacent one third. Roof deformed at SW corner of building, with an adjacent section of roof damage.
22		12.8	12.8		Razed prior to attack
23		15.6		15.6	Roof stripped from building.
25		222.0		10.0	Roof damage, probably from 3 April attack.
26	a	260.0	38.9	62.6	Roof stripping and deformation of framework from 3 April attack. No evidence of repair to old damage (118.0)
	b	3.0			
27		15.4			No visible damage
29		12.8			No evidence of repair of old damage (10.5)
30	a	232.3			Building is apparently being razed. Roof entirely stripped and much of frame appears to be removed. Photography not clear.
31	a	162.0			No evidence of repair to old damage (63.5) or of new damage. Photography not clear.
	b	3.2			Possibly destroyed or razed; photography is not clear.
	e	16.2			No visible damage.
32		11.0			No evidence of repair to old damage (6.2) or of further clearance.
33		9.5			No visible damage.
34	b	4.3	4.3		Razed, probably civil removal
36	a-c	22.9			No visible damage.
	d	5.8	4.5		East portion razed, civil removal
	e	4.3	4.3		Upper of two stories has been removed; civil removal.
38		12.0	8.0		Eastern two-thirds razed; civil removal.
39		11.6			No visible damage.
40		14.3			No visible damage.
41		9.0			Razed
42		44.8			No visible damage.
44-45		21.8			No visible damage.
47		5.8	5.8		Razed
48	a-b	17.8			No visible damage.
	c	2.1	2.1		Razed, civil removal.
	d	7.3			No visible damage.
	g	2.3	2.3		Roof stripped, dismantling in progress.
	h-j	11.2			No visible damage.
					Note: Two small structures, probably temporary, have been erected on either side of section "K".
54	a	15.0			No visible damage.
58	c-d	14.7			No visible damage.

Built-up area:	2384.7
Prior Damage (including clearance in building 30):	827.7
New Damage or Dismantling:	280.4
(Structural or removal)	150.0)
(Superficial:	129.5)

5-6122a, AF


3PR/5M140 2V 4.13 F/24 32000


26
3PR/5M140 2V 4-15 E/24 32000 RES

AF IPH-3

MIPL 51,882

COVER USED	
MISSION	3 PR 5M 60 2V
PRINTS	23, 24
DATE	27 Feb 1945
QUALITY	Fair
SCALE	1/17,850
DATE OF ATTACK	17 Feb 1945 (Navy)

AC/AS INTELLIGENCE
PHOTOGRAPHIC DIVISION
PHOTO-INTELLIGENCE SECTION

LIMITED DAMAGE INTERPRETATION

NO. 11

CONFIDENTIAL | D/P

DATE 13 March 1945

INTERPRETER Stearns

SHEET NO. 1 OF 4

AREA NO. 90.13 / TARGET NO. 1545

TARGET: NAKAJIMA AIRCRAFT CO

LOCATION: KOIZUMI, JAPAN

This Limited Damage Interpretation has been undertaken in accordance with the conditions as checked below:

- [ ] *Photography is inadequate in scale*
- [ ] *Photography is indequate in quality*
- [ ] *Stereo coverage is lacking or incomplete*
- [ ] *Detailed interpretation is not required*
- [ ] *Damage is below 10% of built-up area*
- [ ] *Total damage is less than 50,000 sq. ft.*
- [ ] *Excessive time between attack and photography*
- [X] *Other factors as noted below*

BUILDING REF. NO.		AREA	VISIBLE DAMAGE STRUCT'L	VISIBLE DAMAGE SUPERF'L	DESCRIPTION OF DAMAGE
					NOTE: Area of plant is snow-covered, thereby including a bomb-count and assignment of cause, and limiting determination of extent and severity of damage. This report should be considered only a preliminary estimate of damage. The actual damage is probably greater than shown. 25 buildings were wholly or partially removed from the target area prior to 9 Feb 1945. Most of these were small, combustible structures. Three had been identified as machine shops.
1	a	13.3			No visible damage.
	b	3.5			Addition constructed by 9 Feb 1945. No visible damage.
2		37.5			Removed by 9 Feb 1945
3	a	5.7			No visible damage
	b	13.3			" " "
	c	9.5			" " "
4	a	2.1			" " "
	b	10.0			" " "
	c	2.1			" " "
5		42.0	3.6		Damaged section is demolished
6		10.2			No visible damage
7		12.6			" " "
8		9.1			" " "
9		5.0			" " "
10	a	17.6			" " "
	b	2.0			" " "
11	a	416.0	17.6	126.1	Superficial damage in center and at west-end may be more severe.
	b	31.2-10.7=20.5	2.1		Two sections removed by 9 Feb 1945. Direct hit near center

TOTALS				
SITE	SITE AREA	180.4 acres		
	BUILT-UP AREA	2816.7 (27 Feb)		
	% OF SITE BUILT-UP			
DAMAGE	AREA OF DAMAGE	162.0 Struct	319.5 Super	481.5 Total
	% OF BUILT-UP AREA	5.7%	11.4%	17.1%

APPROVED BY:

Ray D. Shipp for
LEWIS E. STEVENS
Major, Air Corps
Chief, Photo Intelligence Section
Evaluation Br., Photographic Division
Office of the Ass't Chief of Air Staff
Intelligence

ALL AREAS ARE PLAN AREAS IN THOUSANDS OF SQUARE FEET

5-6122, AF

AF IPH-3A

AREA NO.	TARGET NO.	LIMITED DAMAGE INTERPRETATION NO. 11	CONFIDENTIAL	D/P
90.13	1545		SHEET NO. 2 OF 4	

6		10.2			No visible damage
7		12.6			" " "
8		9.1			" " "
9		5.0			" " "
10	a	17.6			" " "
	b	2.0			" " "
11	a	416.0	17.6	126.1	Superficial damage in center and at west-end may be more severe.
	b	31.2-10.7=20.5	2.1		Two sections removed by 9 Feb. 1945
					Direct hit near center
	c	6.4			Removed by 9 Feb 1945
12	a	220.4			No visible damage
	b	34.8-11.8=23.0			Sections at each end removed by 9 Feb '45. No visible damage to remainder
	c	8.0			Removed by 9 Feb '45.
13	a	199.8	48.8	56.0	
	b	22.2-19.5=2.7			All but two small and sections removed by 9 Feb 1945.
	c	4.8-3.6=1.2			Removed by 9 Feb 1945
14	a	151.2			No visible damage
	b	16.8-15.5=1.3			All but small end section removed by 9 Feb '45.
	c	4.8-3.6 = 1.2			Removed by 9 Feb 1945.
15		11.9			Removed by 9 Feb 1945
16		4.9			Removed by 9 Feb 1945
17		11.2			Removed by 9 Feb 1945
18		11.9			No visible damage
19	a	20.14			Removed by 9 Feb 1945
	b	1.5			" " " "
	c	3.9			" " " "
20		51.0-10.0=41.0			North end in process of removal 9 Feb '45; removed by 21 Feb. No visible damage to remainder.
21	a	44.0			No visible damage
	b	14.0			" " "
22		123.0-62.3=60.7			No visible damage. Half of building removed by 9 Feb '45.
23	a	6.4			No visible damage
	b	7.2			Possibly damaged, but discoloration believed to be area of melted snow
	c	2.4			No visible damage
24		44.0			Removed by 9 Feb 1945
25	a	209.3			No visible damage
	b	27.3-14.7=12.6			Two sections removed by 9 Feb '45. No visible damage to remainder.

5-6122a, AF

AF IPH-3A

AREA NO.	TARGET NO.	LIMITED DAMAGE INTERPRETATION NO. 11	CONFIDENTIAL	D/P
90.13	1545		SHEET NO. 3 OF 4	

25	c	7.2-5.4= 1.8			Largely removed by 9 Feb 1945. No visible damage to remainder.
26	a	273.0		60.7	Some of this damage is probably structural. Photography is inadequate for accurate assessment.
	b	45.5-2.7= 42.8	1.6		One section removed by 9 Feb '45. Additional adjacent section demolished by 27 Feb '45.
	c	7.2-5.1= 2.1			Largely removed by 9 Feb 1945; one small section removed between 9 and 27 Feb '45. No visible damage to remainder.
27		16.8			No visible damage
28		24.8	24.8		Demolished; possibly civil removal after 9 Feb '45.
29		14.4			Possibly damaged superficially; photography inadequate for accurate assessment.
30	a	247.2	44.8	56.3	
	b	30.9-23.1= 7.8	2.7		Largely removed by 9 Feb '45. Additional section demolished.
	c	7.2-5.1= 2.1	0.4		Largely removed by 9 Feb '45. One small section demolished.
31	a	181.5		20.4	Photography is inadequate for accurate assessment
	b	30.6-28.9= 1.7			Removed by 9 Feb '45; no visible damage to remainder
	c	3[illegible]-1.6= 1.6			One half removed by 9 Feb 1945. No visible damage to remainder.
	d	58.8			Removal practically complete by 9 Feb 1945, complete 27 Feb 1945.
32		20.0	10.0		Center half of building demolished by blast.
33		10.0			No visible damage
34	a	6.0			No visible damage
	b	5.0			" " "
35	a	66.5-38.0 = 28.5			South half removed by 9 Feb 1945; no visible damage to remainder
	b	5.7			No visible damage
36	a	5.6			No visible damage
	b	9.8			" " "
	c	8.4			" " "
	d	7.2			" " "
	e	5.4			" " "
37		6.0			No visible damage
38		14.0			" " "
39	a	1.4			" " "
	b	3.4			" " "
	c	6.6			" " "
40		12.0			" " "
41		14.4			" " "
42	a	18.5			" " "
	b	18.5			" " "
	c	3.5			" " "
43		11.5			Removed by 9 Feb 1945
44	a	3.0			No visible damage
	b	2.7			" " "
	c	7.0			" " "
	d	2.0			" " "
45		7.5			" " "
46		22.5			" " "
47		6.0			" " "
48	a	15.3			" " "
	b	5.1-3.4= 1.7			Partially removed by 9 Feb '45; no damage to remainder

AERIPH-3A

AREA NO.	TARGET NO.	LIMITED DAMAGE INTERPRETATION NO. 11	CONFIDENTIAL	D/P
90.13	1545		SHEET NO. 4 OF 4	

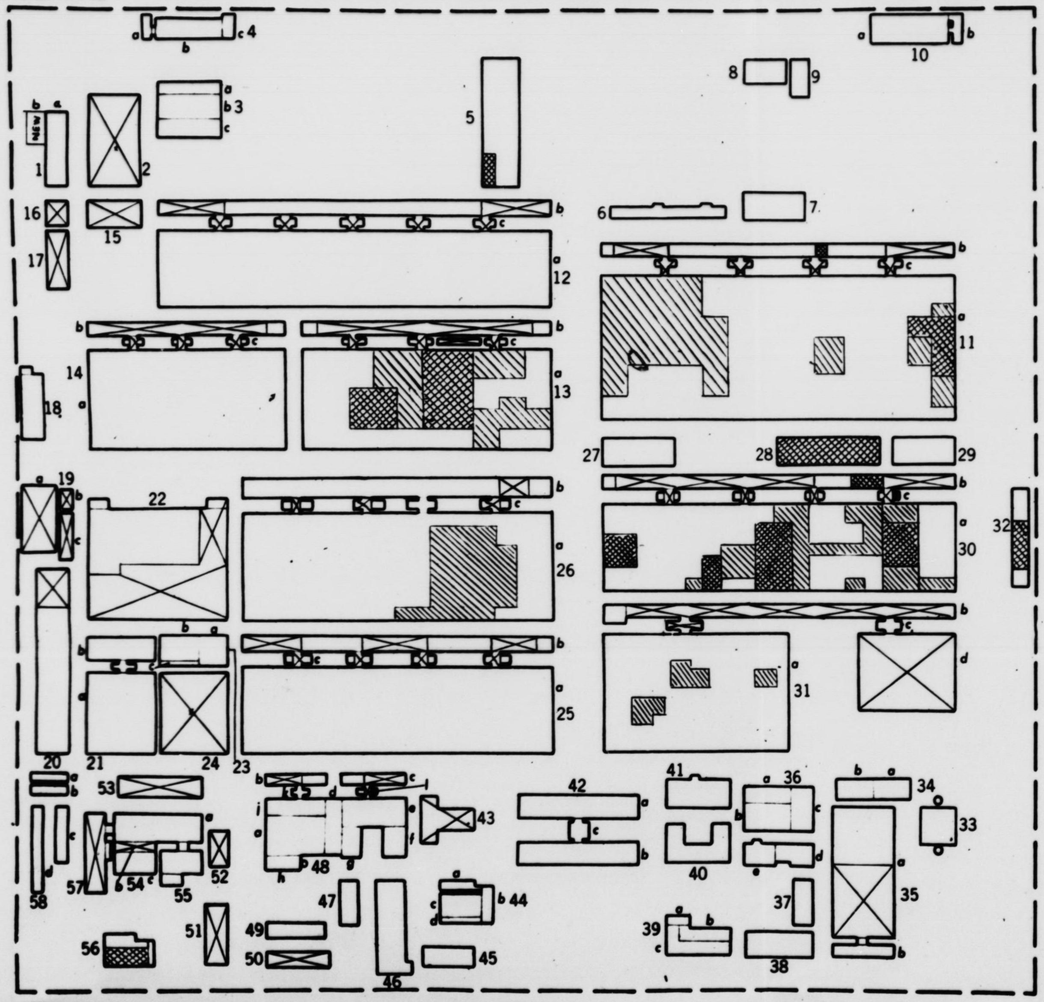
48	c	6.0-4.0= 2.0			Partially removed by 9 Feb '45; no damage to remainder.
	d	7.0			No visible damage
	e	12.6			" " "
	f	4.9			" " "
	g	4.9			" " "
	h	3.0			" " "
	j	8.5			" " "
	k	3.2-0.2= 3.0			Small section removed by 9 Feb '45; no visible damage to remainder.
49		6.8			No visible damage
50		7.6			Removed by 9 Feb 1945
51		11.2			" " " "
52		4.5			" " " "
53		10.0			" " " "
54	a	18.2			No visible damage
	b	3.6			Removed by 9 Feb 1945
	c	9.1			No visible damage
55		9.1			No visible damage
56		10.5	5.6		Damaged portion is demolished
57		13.2			Removed by 9 Feb 1945
58	a	2.4			No visible damage
	b	2.4			Possibly damaged; photography not adequate to assess
	c	5.4			No visible damage
	d	6.9			" " "

5-6122a, AF


3PR-5M60-XX1BC-2V 2.27 F/24 34000 REST


3PR-5M60-XX1BC-2V 2.27 F/24 34000 REST

CONFIDENTIAL



WORKERS QUARTERS AND RECREATION AREA

INDUSTRIAL DAMAGE PLAN
AREAS OF VISIBLE DAMAGE

STRUCTURAL DAMAGE

SUPERFICIAL DAMAGE

CIVIL REMOVAL

CONFIDENTIAL

SCALE IN FEET
1:3600

0 200 400 600 800 1000

AC/AS INTELLIGENCE PHOTOGRAPHIC DIVISION
PHOTO INTELLIGENCE SECTION

NAKAJIMA AIRCRAFT CO.
KOIZUMI, JAPAN

TARGET NO. 90.13/1545

PHOTOGRAPHY OF 27 FEB. 45

C.F.L. 744.021 - D1

MIP 1 - 59,071

AF IPH-3

COVER USED	
MISSION	31R/5M 140
PRINTS	2V:25,26
DATE	13 April 1945
QUALITY	poor
SCALE	1/16000
DATE OF ATTACK	3 April 1945

AC/AS INTELLIGENCE
PHOTOGRAPHIC DIVISION
PHOTO-INTELLIGENCE SECTION

LIMITED DAMAGE INTERPRETATION

NO. 29

CONFIDENTIAL D/P

DATE 4 May 1945

INTERPRETER Stearns

SHEET NO. 1 OF 2

AREA NO. 90.13 / TARGET NO. 1545

TARGET NAKAJIMA AIRCRAFT CO.

LOCATION Koizumi, Japan

This Limited Damage Interpretation has been undertaken in accordance with the conditions as checked below:

- [X] *Photography is inadequate in scale*
- [X] *Photography is indequate in quality*
- [ ] *Stereo coverage is lacking or incomplete*
- [ ] *Detailed interpretation is not required*
- [ ] *Damage is below 10% of built-up area*
- [ ] *Total damage is less than 50,000 sq. ft.*
- [ ] *Excessive time between attack and photography*
- [ ] *Other factors as noted below*

BUILDING			VISIBLE DAMAGE		DESCRIPTION OF DAMAGE
REF. NO.		AREA	STRUCT'L	SUPERF'L	
					The following is a status report as of 13 April. Civil removal of buildings has continued, and some damage was inflicted by the attack of 3 April. As it is not possible to differentiate between damage and dismantling in all cases, they are both carried as damage, with differentiation as far as possible in the notes.
					The chief sign of activity in the plant is the continued removal of buildings.
1	a	12.0			No visible damage.
	b	3.2			No visible damage.
3		23.4			No visible damage.
4	a	1.3			No visible damage
	b	8.9		2.2	Roof stripping; probably being dismantled.
	c	2.4			No visible damage
5		36.2		6.4	Area of old damage (3.2) removed. Roof stripped from an adjacent area, probably being dismantled.
6		11.9	11.9		Probably destroyed by attack of 3 April.
8-9		12.2	12.2		Probably civil removal.
10	b	2.9	2.9		Probably civil removal.
11	a	378.0			No evidence of repair of old damage (254.0) nor of additional damage. Photography, however, not clear.
	d	31.5			
12	a	171.0			No visible damage
	b	15.2	13.2		Most of remaining portion of section "b" removed; probably civil removal.
	d	32.4		16.2	Roof stripping. Probably damage from 3 Apr. attack
	e	28.3	8.7		Probably damage from 3April attack.
13		191.8			No evidence of repair of old damage (140.0) or of new damage.
14		153.1			No visible damage.
20		22.7		5.7	Roof stripped from one section. Remainder of roof is pitted with small holes.
21	a	42.0	23.3	8.5	East half of building razed. Roof stripped from one third of remaining section; roof pitted in an

TOTALS		
SITE	SITE AREA	
	BUILT-UP AREA	2384.7
	% OF SITE BUILT-UP	
DAMAGE	AREA OF DAMAGE	1108.1 (total)
	% OF BUILT-UP AREA	49.5%

APPROVED BY:

for WALTER HARRINGTON
Major, Air Corps
Chief, Evaluation Branch
Photographic Division
Office of Ass't Chief of Air Staff,
Intelligence

ALL AREAS ARE PLAN AREAS IN THOUSANDS OF SQUARE FEET

5-6122, AF

AF IPH-3A

AREA NO.	TARGET NO.	LIMITED DAMAGE INTERPRETATION NO. 29	CONFIDENTIAL	D/P
80.13	1545		SHEET NO.	OF 2

Ref. No.		Building Area	Visual Damage Struct'l	Visual Damage Superf'l	
21a (cont'd)					adjacent one third. Roof deformed at SW corner of building, with an adjacent section of roof damage.
22		12.8	12.8		Razed prior to attack
23		15.6		15.6	Roof stripped from building.
25		222.0		10.0	Roof damage, probably from 3 April attack.
26	a	260.0	35.9	62.6	Roof stripping and deformation of framework from 3 April attack. No evidence of repair to old damage (118.0)
	b	3.0			No visible damage
27		15.4			No evidence of repair of old damage (10.5)
29		12.8			Building is apparently being razed. Roof entirely stripped and much of frame appears to be removed. Photography not clear.
30	a	232.3			No evidence of repair to old damage (63.5) or of new damage. Photography not clear.
31	a	162.0			Possibly destroyed or razed; photography is not clear.
	b	3.2			No visible damage.
	e	16.2			No evidence of repair to old damage (6.2) or of further clearance.
32		11.0			No visible damage.
33		9.5			Razed, probably civil removal
34	b	4.3	4.3		No visible damage.
36	a-c	22.9			East portion razed, civil removal
	d	5.8	4.5		Upper of two stories has been removed; civil removal.
	e	4.3	4.3		Eastern two-thirds razed; civil removal.
38		12.0	8.0		No visible damage.
39		11.6			No visible damage.
40		14.3			Razed
41		9.0			No visible damage.
42		44.8			No visible damage.
44-45		21.8			Razed
47		5.8	5.8		No visible damage.
48	a-b	17.8			Razed, civil removal.
	c	2.1	2.1		No visible damage.
	d	7.3			Roof stripped, dismantling in progress.
	g	2.3	2.3		No visible damage.
	h-j	11.2			

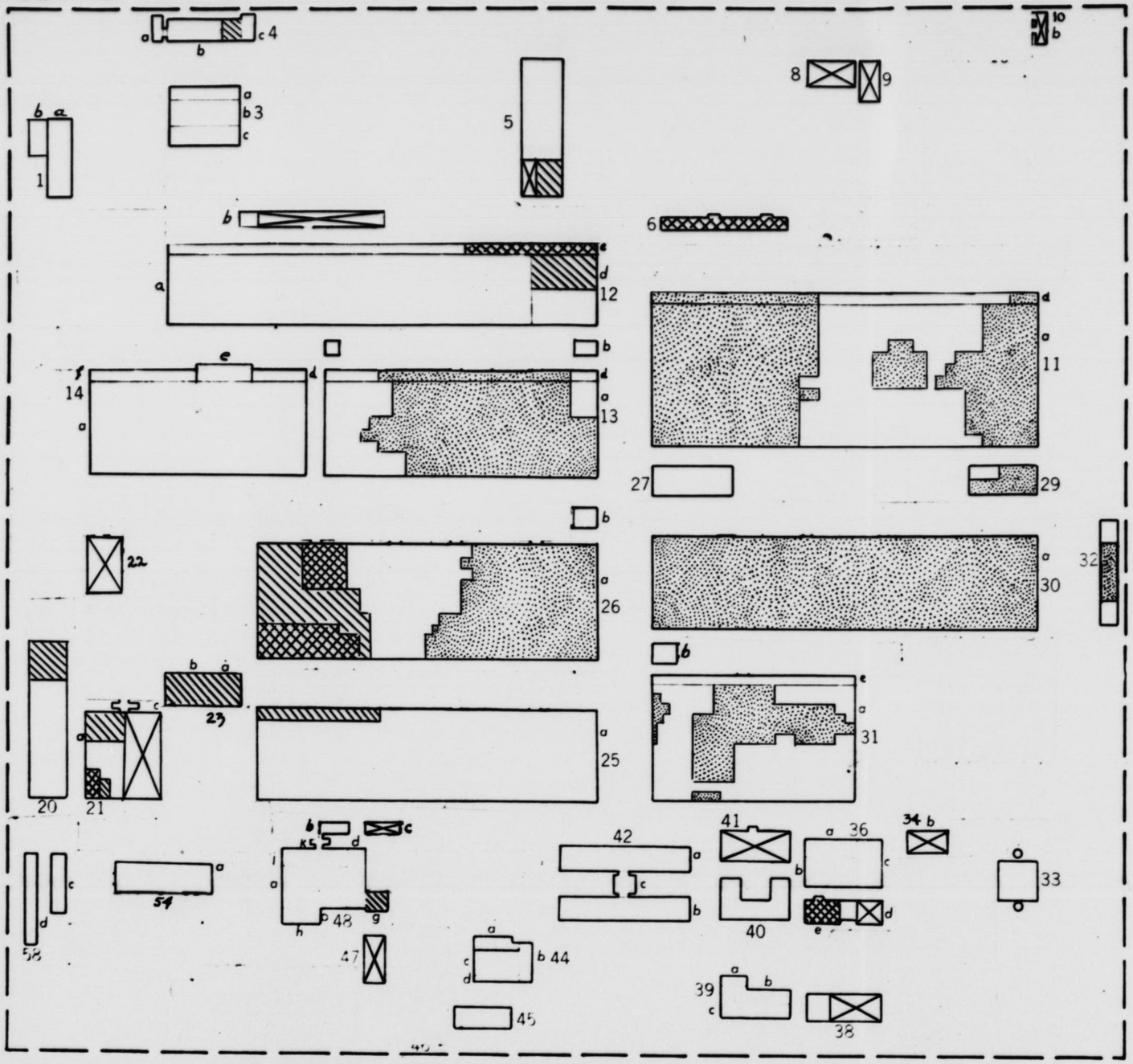
Note: Two small structures, probably temporary, have been erected on either side of section "K".

54	a	15.0	No visible damage.
58	c-d	14.7	No visible damage.

Built-up area:	2384.7
Prior Damage (including clearance in building 30):	827.7
New Damage or Dismantling:	280.4
(Structural or removal)	150.0)
(Superficial:	129.5)

5-6122a, AF

CONFIDENTIAL



WORKERS QUARTERS AND RECREATION AREA

STATUS OF PLANT 13 APRIL

STRUCTURAL DAMAGE

SUPERFICIAL DAMAGE

DAMAGE OF 24 MARCH, NOT REPAIRED

RAZED

CONFIDENTIAL

SCALE IN FEET

0 200 400 600 800 1000

AC/AS INTELLIGENCE PHOTOGRAPHIC DIVISION
PHOTO INTELLIGENCE SECTION

NAKAJIMA AIRCRAFT CO.

KOIZUMI . JAPAN

TARGET NO. 90.13/1545

PHOTOGRAPHY OF 13 APR 1945

C.F.L. 744.021 -D3


3PB/5M140 2V 4.13 F/24 32000


26
3PR/5M140 2V

AF IPH-3

COVER USED	
MISSION	3PR/5M93 3L
PRINTS	37, 39
DATE	24 March 1945
QUALITY	Good
SCALE	1/9600
DATE OF ATTACK	25 Feb 1945

AC/AS INTELLIGENCE
PHOTOGRAPHIC DIVISION
PHOTO-INTELLIGENCE SECTION

LIMITED DAMAGE INTERPRETATION

NO. 11.1

CONFIDENTIAL D/P

DATE 14 April 1945

INTERPRETER Stearns

SHEET NO. 1 OF 4

AREA NO. 90.13 / TARGET NO. 1545

TARGET: Nakajima Aircraft Co.

LOCATION: Koizumi, Japan

This Limited Damage Interpretation has been undertaken in accordance with the conditions as checked below:

- [ ] *Photography is inadequate in scale*
- [ ] *Photography is indequate in quality*
- [ ] *Stereo coverage is lacking or incomplete*
- [ ] *Detailed interpretation is not required*
- [ ] *Damage is below 10% of built-up area*
- [ ] *Total damage is less than 50,000 sq. ft.*
- [X] *Excessive time between attack and photography*
- [ ] *Other factors as noted below*

BUILDING REF. NO.		AREA	VISIBLE DAMAGE STRUCT'L	VISIBLE DAMAGE SUPERF'L	DESCRIPTION OF DAMAGE
	(as of 27 Feb.)				Note: Photography of 24 March provides a more adequate basis for assessing damage inflicted in the attack of 25 February. Although the extent of damage was greater than previously reported, its severity is not as great. Bomb-count and assignment of cause are still not possible. Lacking adequate coverage in February, it cannot be determined whether repair is in progress. Some of the increase in damaged areas is probably clearance in anticipation of repair; it is not known whether or not any damaged structural members have been replaced. Civil removal of buildings, which was in progress prior to attack, has continued.
1	a	13.3			No visible damage
	b	3.6			Addition constructed by 9 February. No visible damage
2		(37.5)			Removed by 9 February
3		28.5			No visible damage
4		14.2			No visible damage
5		42.0	3.6		Damaged section is demolished. Debris cleared by 24 March
6		10.2			No visible damage
7		12.6			Removed between 27 February and 24 March
8		9.1			No visible damage
9		5.0			No visible damage
10	a	17.6			Removed between 27 Feb and 24 Mch
	b	2.0			No visible damage
11	a	416.0	2.3	256.2	Extensive roof stripping but main framing members appear to be intact.
	b	31.2-10.7 = 20.5	2.1		An additional 10,300 sq. ft. including damaged section removed between 27 Feb and 24 Mch

TOTALS				
SITE	SITE AREA	130.4 acres		
	BUILT-UP AREA	2818.7 (27 Feb)		
	% OF SITE BUILT-UP			
DAMAGE	AREA OF DAMAGE	133.8 Struct.	696.1 Super.	829.9 Total
	% OF BUILT-UP AREA	4.8%	24.7%	29.5%

APPROVED BY:

Walter Harrington

WALTER HARRINGTON
Major, Air Corps
Chief, Evaluation Branch
Photographic Division
Office of Ass't Chief of Air Staff, Intelligence

ALL AREAS ARE PLAN AREAS IN THOUSANDS OF SQUARE FEET

5-6122, AF

AFIPH-3A

AREA NO. / TARGET NO.	LIMITED DAMAGE INTERPRETATION	CONFIDENTIAL	D/P
90.13 / 1545	NO. 11.1	SHEET NO. 2 OF 4	

Building Ref. No.		Area	Visible Damage: Struct'l	Superf'l		
	c	6.4-5.6 = 0.8			Almost completely removed by 9 February.	
12	a	220.4			No visible damage	
	b	34.8-11.8 = 23.0			Sections at each end removed by 9Feb. An additional 12,500 sq.ft. removed between 27 Feb and 24 March.	
	c	8.0-6.8 = 1.2			Largely removed by 9 Feb.	
13	a	199.8	33.3	143.2	Extensive roof stripping, but main framing members appear intact except in two places.	
	b	22.2-19.5 = 2.7			All but two small end sections removed prior to 9 Feb.	
	c	4.8-3.6 = 1.2			Largely removed by 9 Feb.	
14	a	151.2			No visible damage	
	b	16.8-15.5 = 1.3			All but small end section removed by 9 Feb.	
	c	4.8-3.6 = 1.2			Largely removed by 9 Feb.	
15		(11.9)			Removed by 9 Feb 1945	
16		(4.9)			Removed by 9 Feb 1945	
17		(11.2)			Removed by 9 Feb 1945	
18		11.9			11,500 sq. ft removed between 27 Feb and 24 Mch.	
19		(25.8)			Removed by 9 Feb 1945	
20		51.0-10.0 = 41.0			North end in process of removal 9 Feb; removed by 27 February. No visible damage to remainder.	
21	a	44.0			No visible damage	
	b	14.0			Removed between 27 Feb and 24 Mch.	
22		123.0-73.8 = 49.2			Half of bldg removed by 27 Feb. One additional 33,800 square feet removed between 27 Feb and 24 Mch.	
23		16.0			No visible damage	
24		(44.0)			Removed by 9 Feb.	
25	a	209.3			No visible damage	
	b	27.3-14.7 = 12.6			Two sections removed by 9 Feb. An additional 11,400 sq. ft removed between 27 February and 24 March.	
	c	7.2-5.4 = 1.8			Largely removed by 9 Feb.	
26	a	273.0	4.5	120.0		
	b	45.5-2.7 = 42.8	1.6		One section removed by 9 Feb. An additional 41,500 sq. ft including damaged section, removed between 27 Feb and 24 March.	
	c	7.2-5.1 = 2.1			Largely removed by 27 Feb.	
27		16.8			No visible damage	
28		24.8	24.8		Site cleared between 27 Feb and 24 Mch.	
29		14.4	9.0	2.7	Severe distortion of framework at east end. No evidence of attempt to repair.	
30	a	247.2	49.9	135.0		
	b	30.9-23.1 = 7.8	2.7		Largely removed by 9 Feb. An additional 6500 sq ft including damaged section removed by 24 Mch.	

5-6122a, AF

AFIPH-3A

AREA NO. / TARGET NO.	LIMITED DAMAGE INTERPRETATION NO.____	CONFIDENTIAL	D/P
90.13 / 1545		SHEET NO. 3 OF 4	

30	c	7.2-5.1 = 2.1	0.4		Largely removed by 9 February. One section demolished by attack.
31	a	31.5		39.0	Roof stripping, etc.
	b	30.6-28.9 = 1.7			Largely removed by 9 Feb.
	c	3.2-1.6 =1.6			One half removed by 9 Feb.
	d	(58.8)			Removed by 9February
32		20.0	10.0		Center section demolished. Debris has been cleared
33		10.0			No visible damage
34	a	6.0			Removed between 27 Feb and 24 Mch
	b	5.0			No visible damage
35	a	66.5-38.0 = 28.5			South half removed by 9 Feb. Remainder removed between 27 Feb and 24 March.
	b	5.7			Removed between 27 Feb and 24 March.
36	a-c	23.8			No visible damage
	d-e	12.6			Dismantling in progress 24 March
37		6.0			Removed between 27 Feb and 24 March
38		14.0			Eastern two-thirds being dismantled 24 March.
39		11.4			No visible damage
40		12.0			No visible damage
41		14.4			No visible damage
42		40.5			Between 27 Feb and 24 Mch, sections "A" and "B" camouflaged by a painted pattern resembling stripped timber framing.
43		(11.5)			Removed by 9 Feb 1945
44		14.7			No visible damage
45		7.5			No visible damage
46		22.5			Removed between 27 Feb and 24 Mch.
47		6.0			No visible damage
48	a	15.3			No visible damage
	b	5.1-3.4 = 1.7			Partially removed by 9 Feb
	c	6.0-4.0 = 2.0			Partially removed by 9 Feb. Dismantling of remainder in progress 24 Mch.
	d	7.0			No visible damage
	e	12.6			Removed between 27 Feb and 24 Mch
	f	4.9			Removed between 27 Feb and 24 March
	g	4.9			One-half removed, remainder being dismantled on 24 Mch
	h	3.0			No visible damage
	j	8.5			No visible damage
	k	3.2-0.2 = 3.0			Small section removed by 9 Feb
49		6.8			Removed between 27 Feb and 24 Mch
50		(7.6)			Removed by 9 Feb
51		(11.2)			" " "
52		(4.5)			" " "
53		(10.0)			" " "
54	a	18.2			No visible damage
	b	(3.6)			Removed by 9 Feb
	c	9.1			Removed between 27 Feb and 24 Mch
55		9.1			Removed between 27 Feb and 24 Mch
56		10.5	9.6		Damage is possibly civil removal in process 27 Feb. Site now clear.
57		(13.2)			Removed by 9 Feb
58		17.1			No visible damage

AF IPH-3A

AREA NO.	TARGET NO.	LIMITED DAMAGE INTERPRETATION NO. 11.1	CONFIDENTIAL	D/P
90.13	1545		SHEET NO. 4 OF 4	

Built-up area as of 27 February: 2813.7

Damage by attack of 25 February:

(a)	Structural	133.8
(b)	Superficial	696.1
	Total	829.9

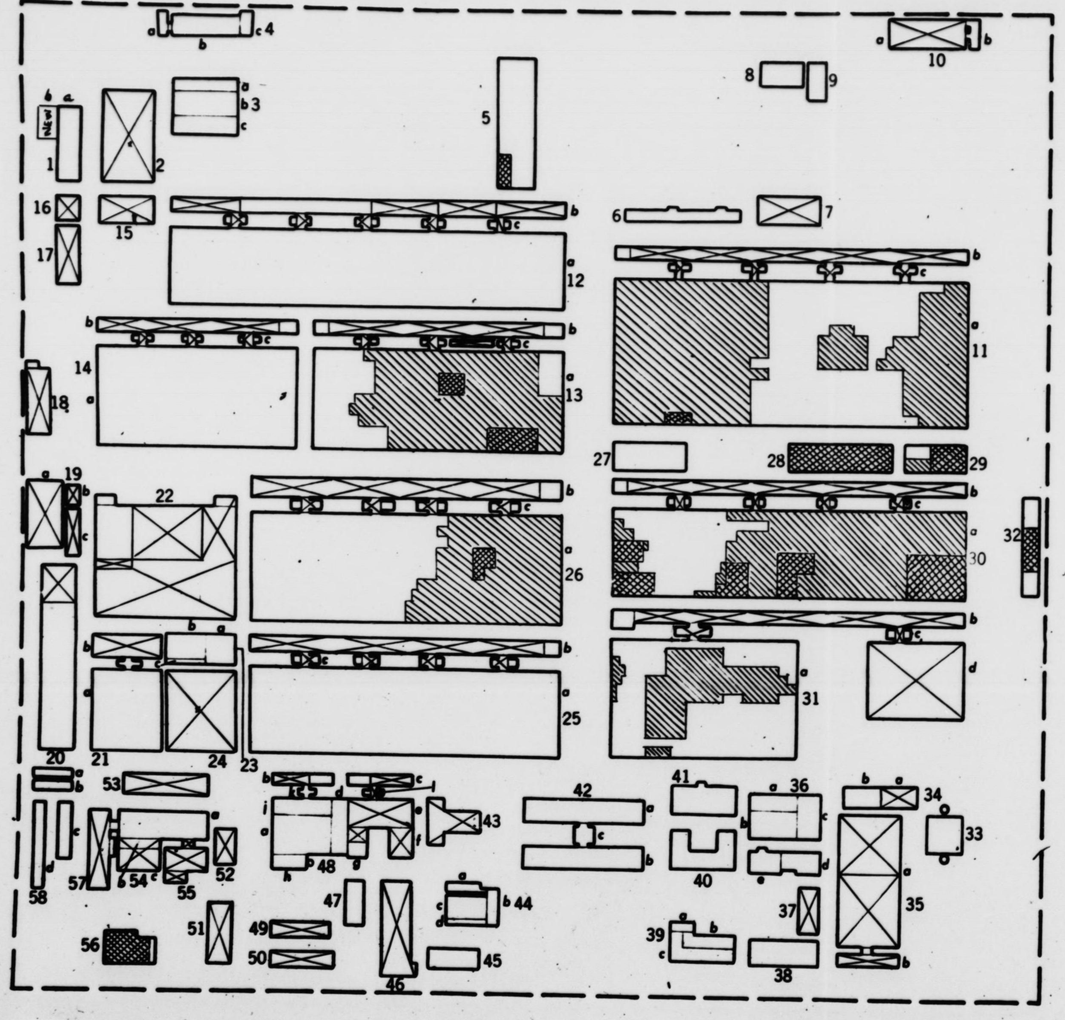
Civil removal 27 February to 24 Mch: 287.9
(not including areas of damage)

5-6122a, AF


3PR/5M98 3L 24 5/40 32000 REST


3PR/5M98 3L 3-24 F/40 32000 REST
39
14119
406
EASTMAN 3188

CONFIDENTIAL



WORKERS QUARTERS AND RECREATION AREA

AREAS OF DAMAGE

STRUCTURAL DAMAGE

SUPERFICIAL DAMAGE

CIVIL REMOVAL

CONFIDENTIAL

SCALE IN FEET

0 200 400 600 800 1000

AC/AS INTELLIGENCE PHOTOGRAPHIC DIVISION
PHOTO INTELLIGENCE SECTION

NAKAJIMA AIRCRAFT CO.

KOIZUMI, JAPAN

TARGET NO: 90.13/1545

PHOTOGRAPHY OF 24 MAR 45

C.F.L. 744.021 - D2

TARGET NO. 90.13-1545

NAKAJIMA AIRCRAFT – KOIZUMI PLANT
TAKASAKI AREA, JAPAN

ILLUSTRATION NO. 90.13-1545 P3

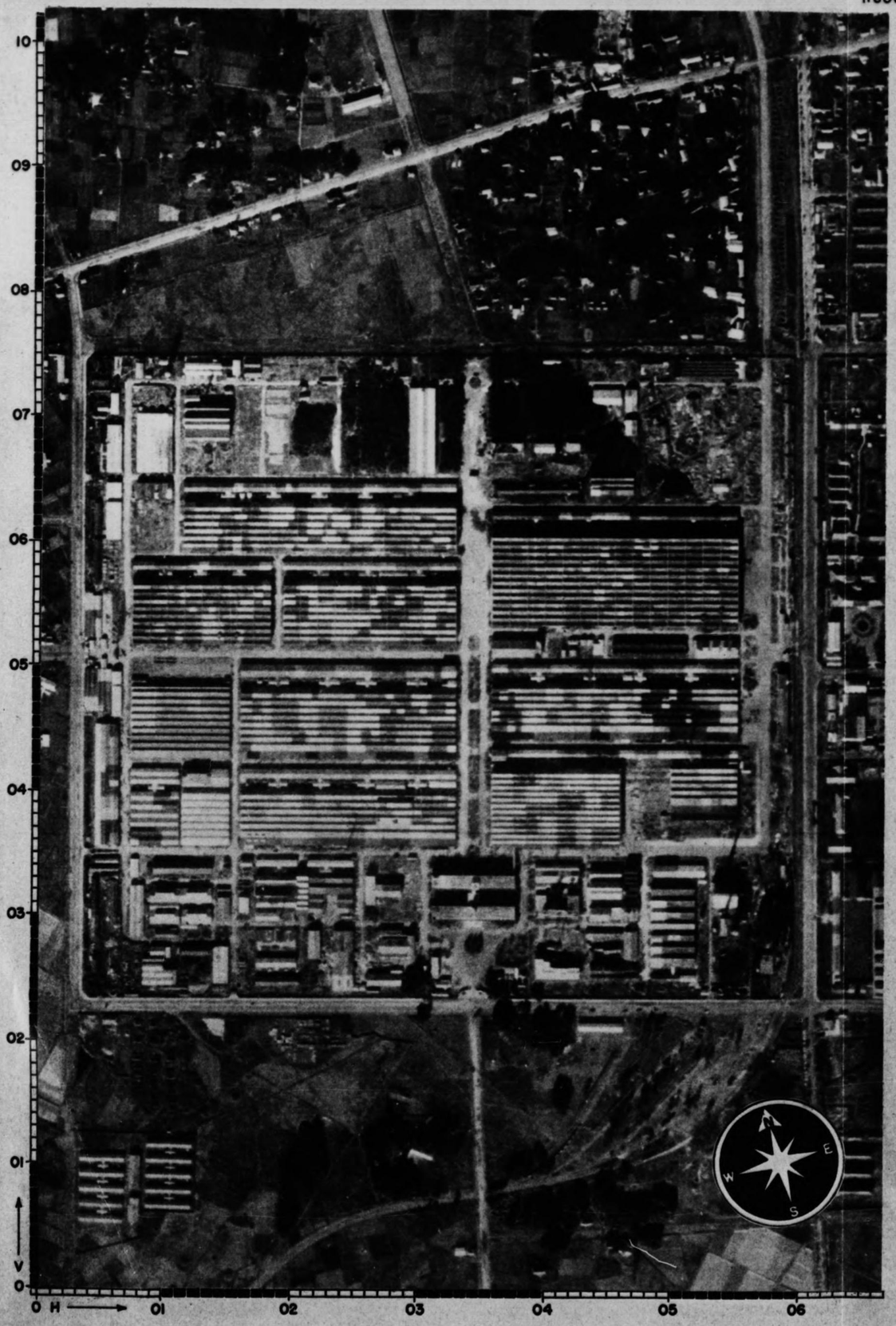
APPROX. COORDINATES 36° 15' N 139° 25' E

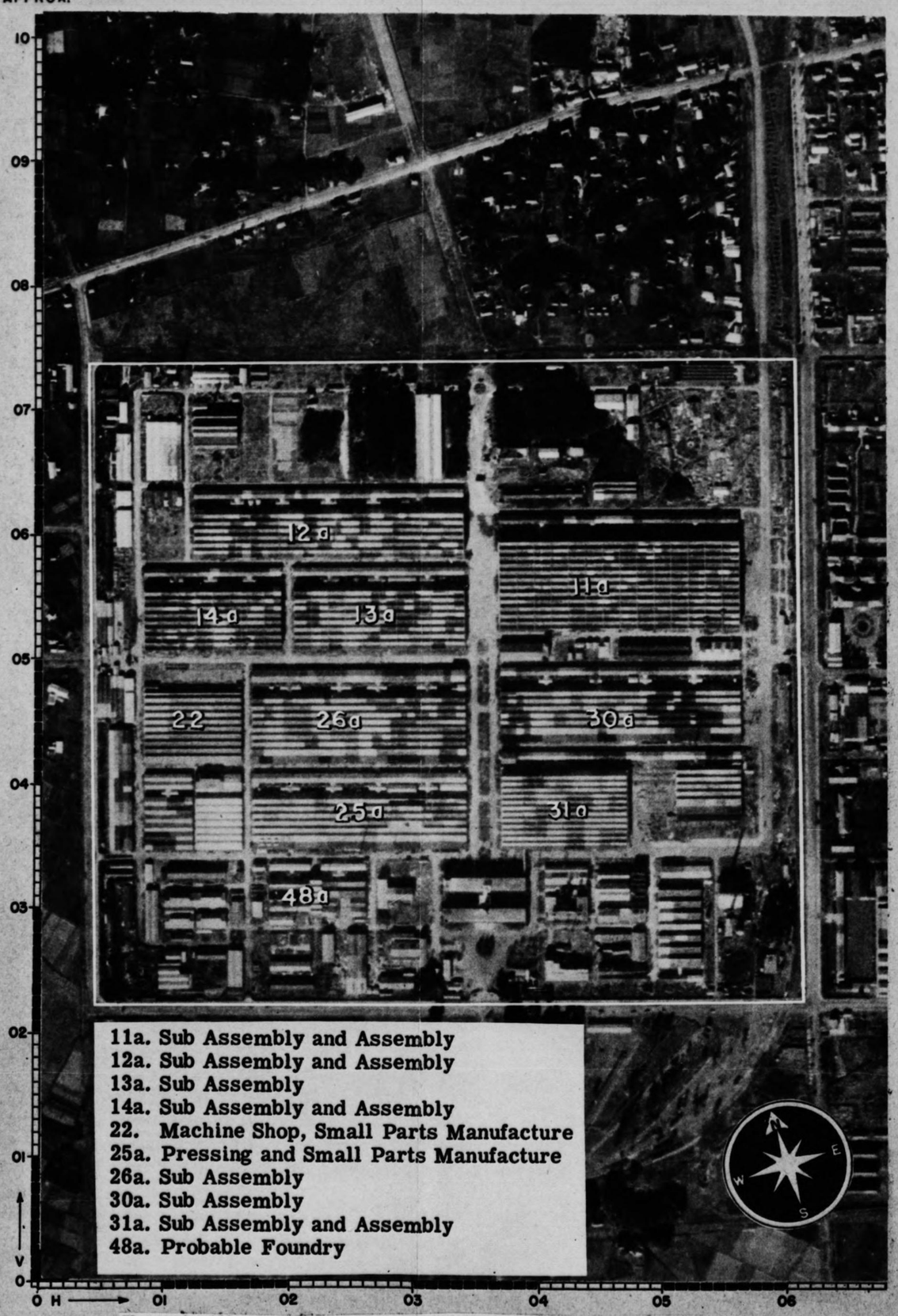
PHOTOGRAPHED 7 NOVEMBER 1944

ISSUED NOVEMBER 1944

CONFIDENTIAL

0 500 1000 1500 2000 2500 3000 FEET
0 1/4 1/2 MILE
1:6000 APPROX.





11a. Sub Assembly and Assembly
12a. Sub Assembly and Assembly
13a. Sub Assembly
14a. Sub Assembly and Assembly
22. Machine Shop, Small Parts Manufacture
25a. Pressing and Small Parts Manufacture
26a. Sub Assembly
30a. Sub Assembly
31a. Sub Assembly and Assembly
48a. Probable Foundry

AC/AS, INTELLIGENCE

CONFIDENTIAL

Target illustrations taken into the air on offensive missions must be trimmed to the photo line

TYPE B
C5-2604, AF

TARGET NO. 90.13-1545

APPROX. COORDINATES 36° 15' N 139° 25' E

PHOTOGRAPHED 7 NOVEMBER 1944

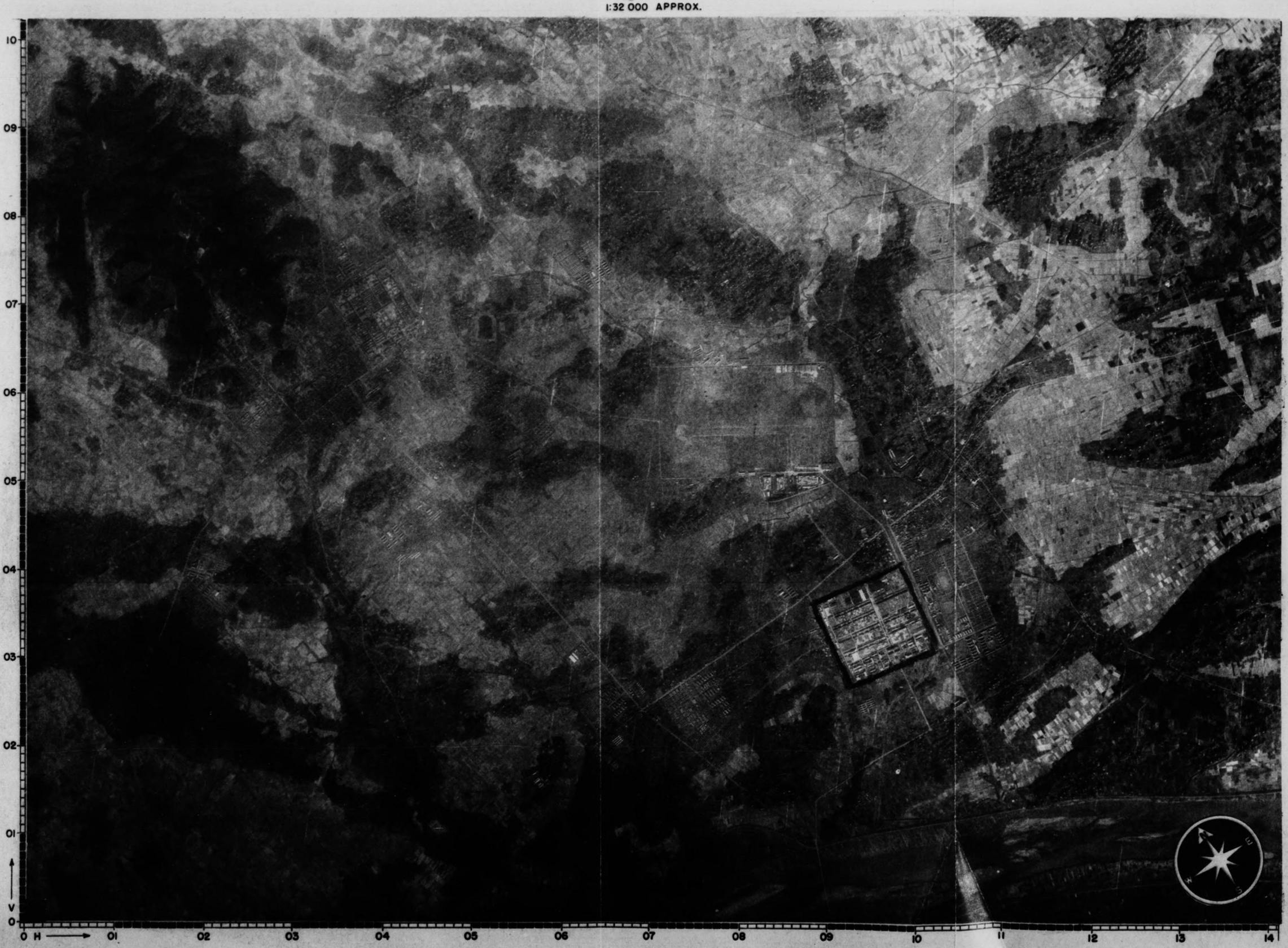
NAKAJIMA AIRCRAFT— KOIZUMI PLANT
TAKASAKI AREA, JAPAN

0 2000 4000 6000 FEET
0 ½ 1 MILE
1:32 000 APPROX.

ILLUSTRATION NO. 90.13-1545 P2

ISSUED NOVEMBER 1944

CONFIDENTIAL



JOINT TARGET GROUP, WASHINGTON, D. C.

TARGET INFORMATION SHEET

SHEET....90:13-1545–TI
DATE.....2 June 1945
PAGE.....1

TARGET.....90:13-1545
OBJ. AREA.....90:13
OBJ. FOLDER...90:12-13
CATEGORY End Prdt. Ind.–AIRCRAFT

LAT.....36°15'N
LONG.....139°25'E
ALT.....125 feet

NAKAJIMA AIRCRAFT, KOIZUMI PLANT
(Nakajima Hikoki KK, Koizumi Seisakusho)

KOIZUMI **JAPAN**

ALL PREVIOUS SHEETS CANCELLED

NOTE: This Target Information Sheet is issued to show the status and importance of the target following serious damage by air attack or removal of buildings. The sheet evaluates the target in the light of all intelligence available to JTG relating to damage and repair at the date of issue.

SIGNIFICANCE

Prior to the Navy strike of 24/25 February 1945, this plant specialized in the manufacture of Navy aircraft. Total output of Zeke, Irving, Frances and Rita amounted to 15% of the total output of Japanese combat aircraft.

Dispersal of storage buildings and other shops had begun prior to the Navy attack and has continued after this and the strike by XXI Bomber Command B-29's on 4 April. The combined effects of these two attacks and the dispersal have greatly lowered the target value of the plant. At present, only half of the original floor area remains undamaged, and it is doubtful whether most of the undamaged buildings are being used. Activity probably centers in buildings 25 and 48, the foundry, press and machine shops; it is doubtful if the undamaged final assembly buildings are being used. The plant, at present, is probably making some parts for Nakajima type planes, but it is not now important and will not be important in the future unless substantial repairs are made.

LOCATION

(Refer to Illustration 90:13-1545–P2.)

Approximately 40 miles NNW of Tokyo in the intensively cultivated plain drained by the Tone River, which flows generally SSE about one mile S of the target. Ota village, with a 10-mile wooded ridge extending NW, is less than 3 miles to the NW; the major Kumagaya Air Base (TARGET 90:13-1644) lies 6 miles SW.

The plant is approximately one mile SW of Koizumi, and one mile E of the highway leading due S from Ota across Tone River. The electrified RR entering Koizumi from the E has been extended to the plant and on to Ota. Barracks and administrative buildings adjoin the plant site on the E. About 4900 feet N of the target is an airfield from which assembled planes are flight tested. Approximately 2.7 miles NNW and directly E of Ota village is Nakajima's New Ota assembly plant (TARGET 90:13-1544).

DESCRIPTION AND LAYOUT

(Refer to Illustrations 90:13-1545–P3/1, P5, D/P.) The undamaged buildings lie in two groups on the western side of the plant. The southern group consists of buildings 25 and 48 which are engaged in relatively "deep" processes, *i.e.*, machining, shaping, etc. This group was seen to be active for a considerable period after the Navy strike and probably retains some degree of activity. The second group lies in the NW section of the plant and includes buildings 12 and 14, both originally devoted to Zeke final assembly. There is no present indication of the type of activity carried on in this section, but there is floorspace here which could be used.

PRIMARY OBJECTIVES

None can be selected. Any undamaged building might house machining work.

CONSTRUCTION AND VULNERABILITY

(Refer to Illustrations 90:13-1545–P3/1, P5, D/P.)

Remaining buildings believed in production are one-story, medium span, steel framed structures with roofs and walls of light weight, noncombustible, sheet materials; HE vulnerability classification (as explained in JTG M-3/1) is V4. Administration buildings remaining are of multistory, reinforced concrete frame construction, vulnerability classification V1. Practically all combustible structures have been removed or destroyed except for a few minor storage buildings dispersed around the edge of the plant.

WEAPON RECOMMENDATIONS

Instructions with regard to weapons will usually be given in Field or Operational Orders, but in the absence of such instructions and to assist Planners in formulating such orders, the following information is given:

An attack with high explosive bombs only is recommended, since the remaining buildings of productive importance are non-combustible and major administrative units are fire resistant. Weapons should be selected as follows:

	High Explosive	Fuzing	Incendiaries
Preferred:	1000-lb GP or	0.01 N/ND T	No incendiaries are recommended
	2000-lb GP or	0.01 N/ND T	
	500-lb GP	0.01 N/ND T	
Alternative:	250-lb GP (low altitude only)	0.025 N/ND T	
Not recommended:	100-lb GP SAP or AP bombs Depth bombs		

Notes: (a) These recommendations are on a weight for weight basis. The use of 8-15 sec. delay for minimum altitude attack is recommended.

(b) Use of 0.1 N or 0.025 N is recommended if 0.01 N fuzing is unavailable, and 0.01 T if ND T unavailable. Aircraft production buildings are best destroyed by blast effects, and thus ND fuzing is recommended.

Published in Office of AC/AS Intelligence, A. A. F., by Combined Personnel of U. S. and British Services for the use of Allied Forces

ADDITIONAL INFORMATION

(Refer to Illustration 90:13-1545–P3/1, P5, D/P.)

Total damage to the plant amounts to about 50% of the roof area. Of the eight principal buildings, five (Nos. 11, 13, 26, 30 and 31) received more than 50% damage, two (Nos. 12 and 25) received slight damage and one was not hit. Structural damage was, however, light, being slightly more than 6% of the area of pre-attack primary objectives.

Plane loss in this plant is estimated to be somewhat less than is usually indicated by 50% roof damage for two reasons:

(1) Nearly all of the damage was superficial. This suggests a relatively low level of damage to tools and essential equipment, and consequently a fairly rapid recovery of production at a new location.

(2) Nearly 500,000 square feet of building area had been removed prior to the first attack. However, since most of the buildings removed were smaller storage type outbuildings, it is believed that they were inflammable or housed inflammable contents and were moved to reduce the fire hazard rather than to disperse production facilities.

The eastern half of the plant believed making multiple engine planes received more damage in the Navy strike than did the western half, believed making single engine planes. Results from this strike are assessed to have caused a loss of two months' pre-attack output in the eastern and one months loss in the western half —a total of 670 planes.

The later B-29 attack on 4 April did little damage except in the western half. The added damage probably amounted to two weeks' production of single engine planes—about 170. The total loss is, therefore, 840 planes. While the superficial character of the damage reduced the loss aircraft output resulting from the attack, probable dispersal of equipment has greatly lowered its target value.