

III a (17)

HITACHI ENGINEERING WORKS

99











file 1476  
AS

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C. I. U.  
XXI BOMBER COMMAND  
APO 234, c/o POSTMASTER  
SAN FRANCISCO, CALIFORNIA

11 July 1945

DAMAGE ASSESSMENT REPORT 127

90.14-1476  
HITACHI ENGINEERING CO., KAIGAN PLANT  
36/35N - 140/39E

Mission No.: 3FR5M323 Target Area: Mito (90.14)  
Date Flown: 6 July 1945 Altitude: 29,000'

SUMMARY

This report assesses damage to the above target resulting from XXI Bom Com Mission 197, 10 June 1945.

Post-strike photos show Target 1476 to be virtually destroyed. Total damage is about 2,142,900 sq.ft., which represents approximately 96.8% of the total roof area.

Of a total of 143 buildings comprising the original plant, only about 10 show no visible damage. These are small buildings having a total roof area of less than 50,000 sq. ft.

About 1,781,040 sq.ft., or 80.5% of the total roof area was destroyed or suffered structural damage. All major buildings are completely damaged, most of them being either destroyed or structurally damaged.

Three stock storage yards (20, 52 and 110 on the attached annotated print) show signs of having been heavily damaged. Railway facilities within the plant area were completely demolished.

STATISTICAL SUMMARY OF DAMAGE

Damage from current strike:

	Square feet of roof	Percent of original roof area
Destroyed or Structural damage	1,781,040	80.5
Superficial:		
1. Guttled	361,860	16.3
2. Minor roof damage	-----	-----
Total damage	2,142,900	96.8

Total roof area of plant: 2,213,104 sq. ft.

ITEMIZATION OF DAMAGE FROM CURRENT STRIKE

Number (Ref. A)	DAMAGE IN SQUARE FEET				Percent of roof	Function of building; comment (Ref. A)
	Roof area	Destroyed or Structural	Guttled	Total		
7 ✓	4,173	4,173		4,173	100	Storage
8 ✓	7,346	7,346		7,346	100	Poss. Pattern Store
12 ✓	39,150	39,150		39,150	100	Poss. light metal casting foundry
13 ✓	18,020	18,020		18,020	100	Workshop

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D/A Report 127, Cont'd.

DAMAGE IN SQUARE FEET

Number Ref. A)	Roof area	Destroyed or Structural	Gutted	Total	Percent of roof	Function of building; comment (Ref.A)
14	2,500	2,500		2,500	100	Storage
15	3,264		3,264	3,264	100	"
16 ✓	9,275	9,275		9,275	100	"
17 ✓	12,412	12,412		12,412	100	"
18	1,682	1,682		1,682	100	"
19 ✓	9,275	9,275		9,275	100	Covered Stock Yard
21 ✓	4,205	4,205		4,205	100	Storage
22	2,782	2,782		2,782	100	"
23 & 24 ✓	8,745	8,745		8,745	100	"
25 ✓	7,685	7,685		7,685	100	"
26 ✓	7,155	7,155		7,155	100	"
27 ✓	42,586	42,586		42,586	100	Machine shop
28 ✓	37,450	37,450		37,450	100	" "
29	3,042	3,042		3,042	100	Storage
30	3,393	3,393		3,393	100	"
31 ✓	37,450	37,340		34,450	100	Assembly
32 ✓	6,825	6,825		6,825	100	Storage
33 ✓	26,520	26,520		26,520	100	Machine Shop
34 ✓	19,176	19,176		19,176	100	" "
35 ✓	4,624	4,624		4,624	100	Prob. test shop
36 ✓	30,940	30,940		30,940	100	Machine shop
37 ✓	13,872	13,872		13,872	100	" "
38 ✓	7,112	7,112		7,112	100	" "
39	3,393	3,393		3,393	100	" "
40 ✓	15,873	15,873		15,873	100	" "
41	3,393	3,393		3,393	100	Storage
42 ✓	47,600		47,600	47,600	100	Assembly
43 ✓	4,624		4,624	4,624	100	Prob. test shop
45 ✓	36,380	36,380		36,380	100	Machine shop
46 ✓	36,380	12,720	23,660	36,380	100	" "
47 ✓	5,850	5,850		5,850	100	Storage
48	3,588	3,588		3,588	100	"
49 ✓	12,480	12,480		12,480	100	"
50	2,262	2,262		2,262	100	"
51 ✓	192,290	192,290		192,290	100	Heavy casting foundry
56 ✓	62,000	8,342	26,250	34,592	56	Prob. foundry
59 ✓	13,862	2,770		2,770	20	Prob. adm. offices
61 ✓	14,960	2,990		2,990	20	Prob. offices
62 ✓	27,220	12,249		12,249	45	Prob. drawing & technical offices
63 ✓	76,500	76,500		76,500	100	Heavy casting foundry
65 ✓	104,040	104,040		104,040	100	Machine shop & forge
66	3,364	3,364		3,364	100	Storage
67 ✓	4,350	4,350		4,350	100	"
68	9,180	9,180		9,180	100	Unidentified
70	7,888	7,888		7,888	100	"
71 ✓	7,888	7,888		7,888	100	"
72	2,958	2,958		2,958	100	"
73 ✓	9,180	9,180		9,180	100	"
74 ✓	83,640		83,640	83,640	100	Assembly
75 ✓	6,728	6,728		6,728	100	Unidentified
76	4,624	4,624		4,624	100	"
77	3,432	3,432		3,432	100	"
78	9,248	9,248		9,248	100	"
79 ✓	7,752	7,752		7,752	100	"
80	2,695	2,695		2,695	100	"
81	2,695	2,695		2,695	100	"
82 ✓	9,248	9,248		9,248	100	"
83 ✓	12,222	12,222		12,222	100	"
84	2,262	2,262		2,262	100	"
85	3,638	3,638		3,638	100	Storage
86	3,298	3,298		3,298	100	"

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D/A Report 127, Cont'd.

Number (Ref. A)	Roof area	Destroyed or Structural	Gutted	Total	Percent of roof	Function of building; comment; (Ref. A)
37	2,262	2,262		2,262	100	Storage
38 ✓	4,875	4,875		4,875	100	"
39	3,047	3,047		3,047	100	"
40 ✓	10,706	10,706		10,706	100	"
41 ✓	8,800	8,800		8,800	100	"
42	3,335	3,335		3,335	100	"
43	2,813	2,813		2,813	100	"
44	2,262	2,262		2,262	100	Transformer Maintenance shop
95	1,463	1,463		1,463	100	Switch house
97 ✓	13,520	13,520		13,520	100	Storage
98 ✓	9,696	9,696		9,696	100	"
99	3,638	3,638		3,638	100	Prob. switch house
100	3,783	3,783		3,783	100	Shop
101	1,131	1,131		1,131	100	Transformer house
102 ✓	7,200	7,200		7,200	100	Storage
103	2,813	2,813		2,813	100	Heat treatment shop
104 ✓	12,870	12,870		12,870	100	Unidentified
105 ✓	5,850	5,850		5,850	100	"
106 ✓	16,080	16,080		16,080	100	Storage
107 ✓	5,136	5,136		5,136	100	"
108 ✓	4,914	4,914		4,914	100	"
109 ✓	71,400	71,400		71,400	100	Reported small transform- er assembly shop
111 ✓	4,176	4,176		4,176	100	Unidentified
112	2,813	2,813		2,813	100	Storage
113 ✓	4,914	4,914		4,914	100	"
114	1,972	1,972		1,972	100	"
115	2,784	2,784		2,784	100	Boiler house
116	3,264	3,264		3,264	100	" "
117 ✓	6,857	6,857		6,857	100	Prob. Diesel eng. house
118 ✓	142,725	142,725		142,725	100	Reported large trans- former assembly shop
119	1,292	1,292		1,292	100	Pump house & water fil- ters
120 ✓	16,500	16,500		16,500	100	Storage
121 ✓	5,365	5,365		5,365	100	"
123 ✓	7,308	7,308		7,308	100	Shop
126	2,652	2,652		2,652	100	Unidentified
127	2,304	2,304		2,304	100	"
130	1,872	1,872		1,872	100	"
131 ✓	229,500	114,250	114,750	229,500	100	Reported turbine shop
132	2,850	2,850		2,850	100	Storage
133 ✓	5,850	5,850		5,850	100	"
134	4,914	4,914		4,914	100	"
135	2,973	2,973		2,973	100	"
136 ✓	96,768	96,768		96,768	100	Prob. motor & switch gear assembly
137 ✓	8,215	8,215		8,215	100	Pattern shop
138 ✓	10,282	10,282		10,282	100	" "
139	3,604	3,604		3,604	100	Boiler house
140 ✓	96,768	38,714	58,072	96,768	100	Large casting foundry
141	3,219	3,219		3,219	100	Storage
142 ✓	104,040	104,040		104,040	100	Prob. material stores
143 ✓	5,304	5,304		5,304	100	Storage
TOTAL:		1,781,040	361,860	2,142,900		

Reference A: AC/AS Functional Analysis Report No. F/A-146 4 June 1945

Photos: Pre-strike: 3PR5M118-3L: 46, 47  
 Post-strike: 3PR5M323-3: 12, 13; 4L: 149, 150

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D/A Report 127, Cont'd.

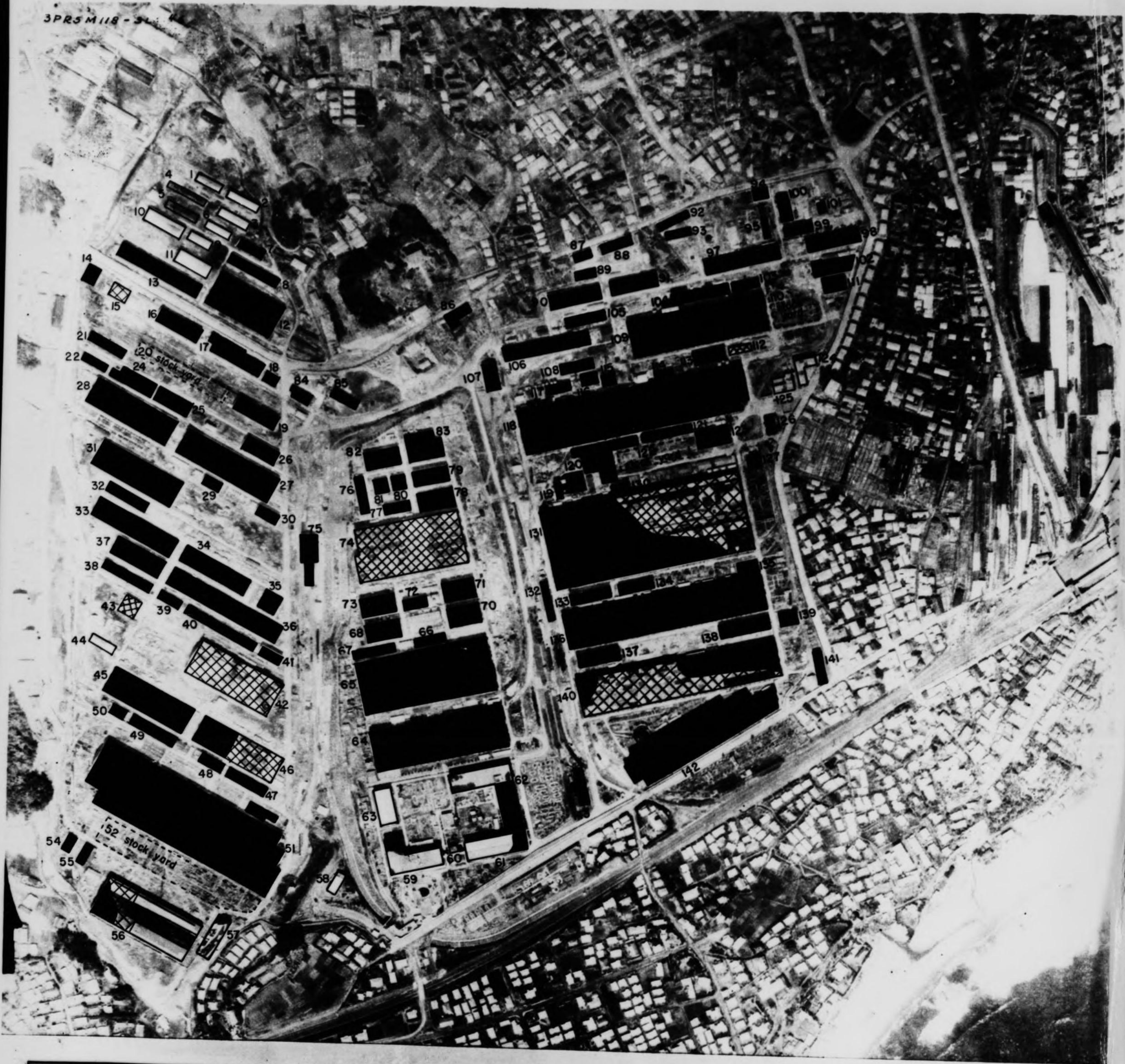
- Inclosures: 1. 3PR5M118-3L: 47 annotated to show damage  
2. 3PR5M323-3: 13 (Post-strike)

Approved.....*E. W. Webster 1st Lt. AC*  
*for* HAMILTON D. DARBY,  
MAJOR, AC

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TARGET 90.14-1476  
 HITACHI ENGINEERING CO.  
 KAIGAN PLANT  
 DAMAGE ASSESSMENT REPORT 127  
 C.I.U. - XXI BOM.COM.



500 0 500  
 APPROX. SCALE IN FEET

LEGEND

- - DESTROYED OR STRUCTURAL DAMAGE
- ▣ - GUTTED



3 PR 5M 523-3:13

3

POST STRIKE  
TARGET 90.14-1476  
HITACHI ENGINEERING CO., KAIGAN PLANT  
DAMAGE ASSESSMENT REPORT 127  
C.I.U. - XXI BOM. COM.

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2IBC 5M197 18V 2 6-10-1008 12-19600 36°35'N130°39'E HITACHI ENG. WK'S. KAIGAN PLT. T30 REST.

1950 EASTMAN TOPOGRAPHIC SAFETY

1950 EASTMAN TOPOGRAPHIC SAFETY





2IBC 5M197 18V 8

6-10-1008 12-19600 36°35'N130°39'E HITACHI ENG. WK'S. KAIGAN PLT. T30 REST.

1017 EASTMAN TOPOGRAPHIC SAFETY

1017

1013 EASTMAN TOPOGRAPHIC SAFETY

1013

ETV



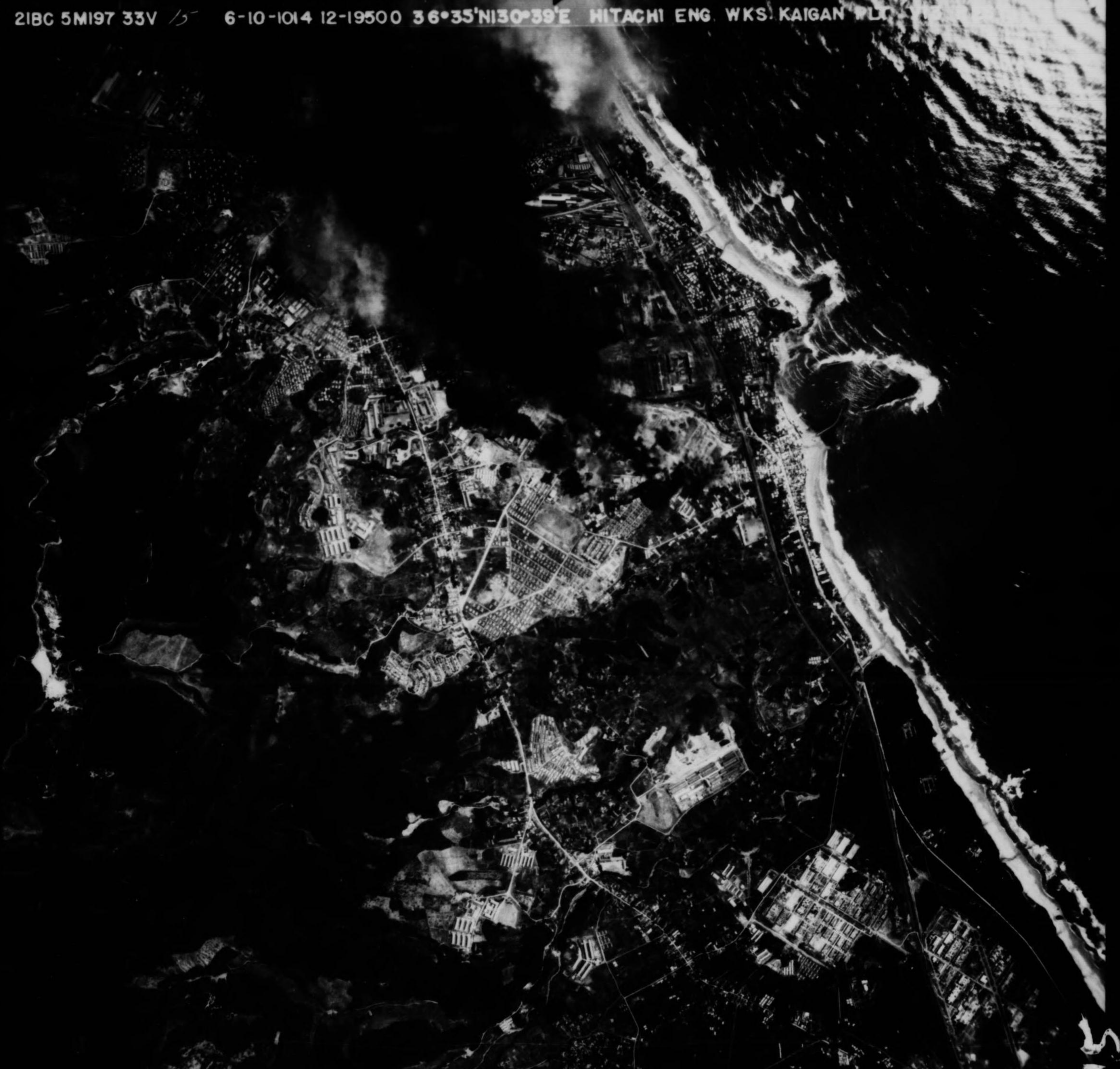


21BC 5M197 33V 15 6-10-1014 12-19500 36°35'N130°39'E HITACHI ENG. WKS. KAIGAN WLD

0537 EASTMAN REGULAR SAFETY

0596 EASTMAN REGULAR SAFETY

IAN REGULAR SAFETY





21BC 5M197 20V 6 6:10:1036 12-19600 36°35'N/130°39'E-HITACHI ENG. WK'S KAIGAN FLT. Z 3 -REST.





21BG 5M197 IV 18 6-10-1014 24-19420 36°35'N/30°39'E HITACHI ENG. WKS, KAIGAN PLT. V9 REST.





21BC 5M197 13V 6-10-1908 24-19000 36°35'N 130°39'E HITACHI ENG. WK'S, KAIGAN PLT. T5 REST.



6



21BC 5M197 3V 14 6-10-1015 12-20100 36°35'N130°39'E HITACHI ENG. WKS. KAIGAN, FLT. V23 WEST

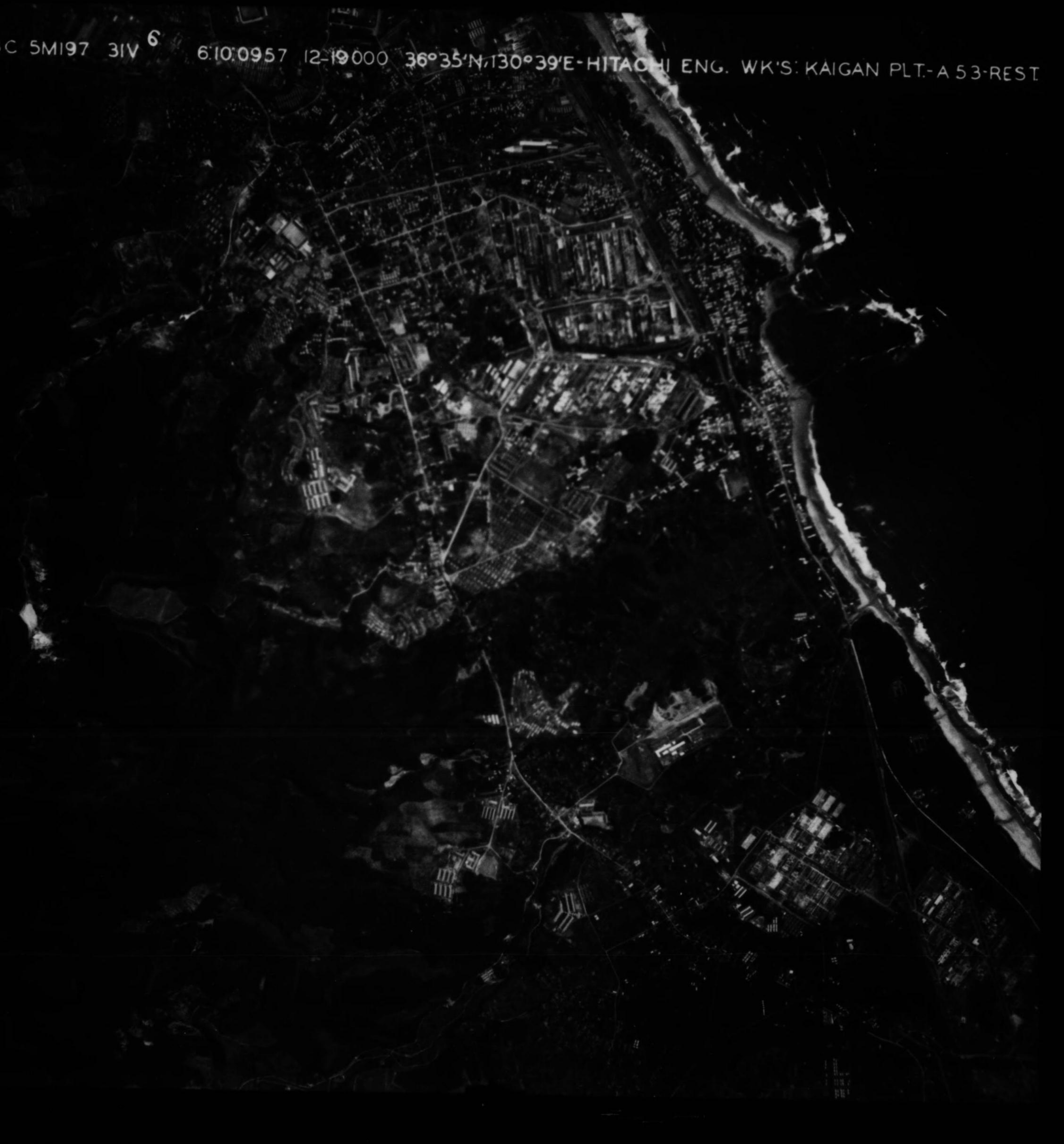




213C 5M197 31V 6 6:10:0957 12-19000 36°35'N,130°39'E-HITACHI ENG. WK'S: KAIGAN PLT.-A 53-REST

7517 EASTMAN DESIGN AND SAFETY

7517 EASTMAN DESIGN AND SAFETY

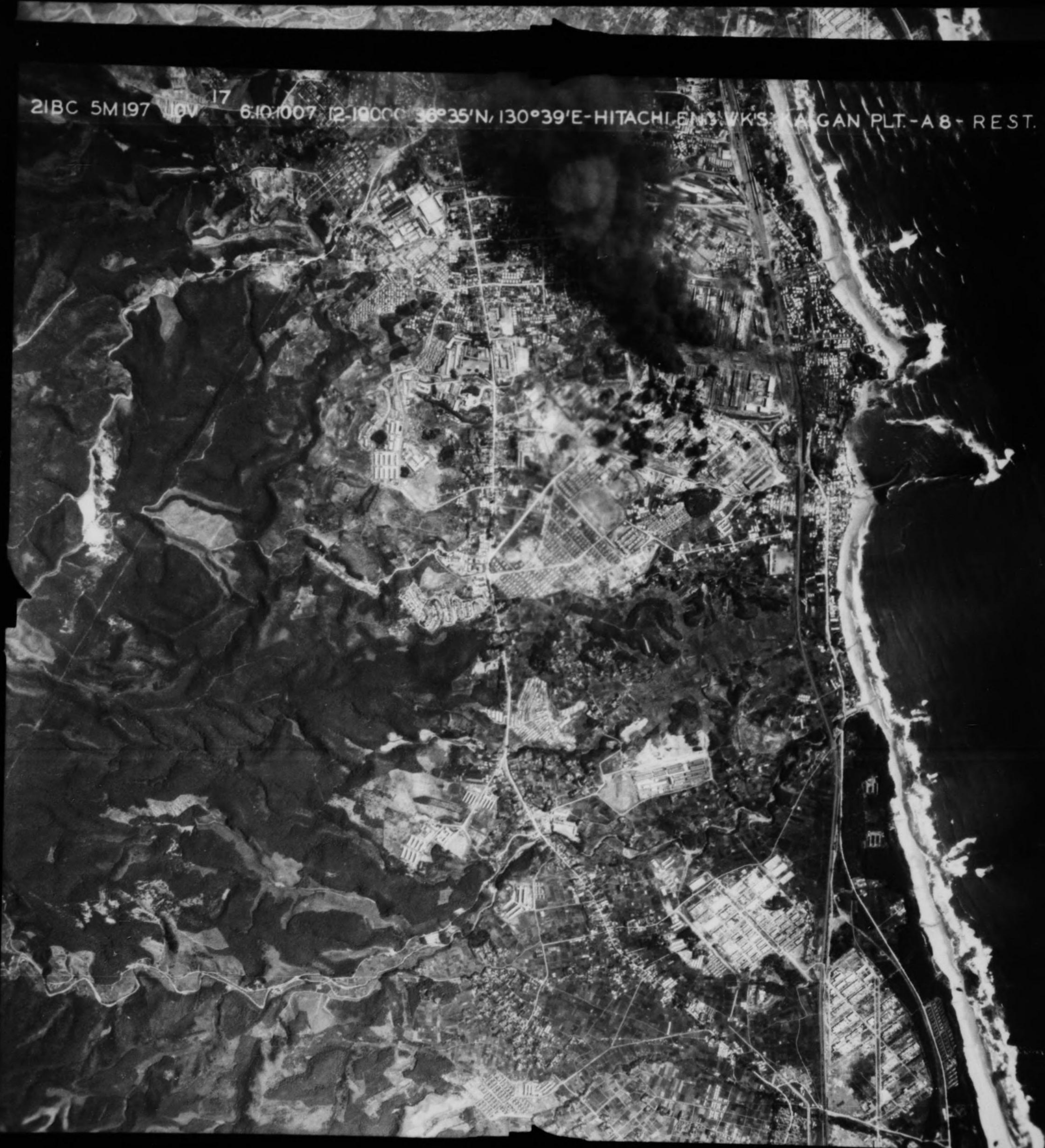




21BC 5M197 110V 17 6:10:007 12-19000 36°35'N, 130°39'E-HITACHI EN 3 WK'S KAGAN PLT.-A8- REST.

3072 EASTMAN KODAK SAFETY

3071 EASTMAN KODAK SAFETY



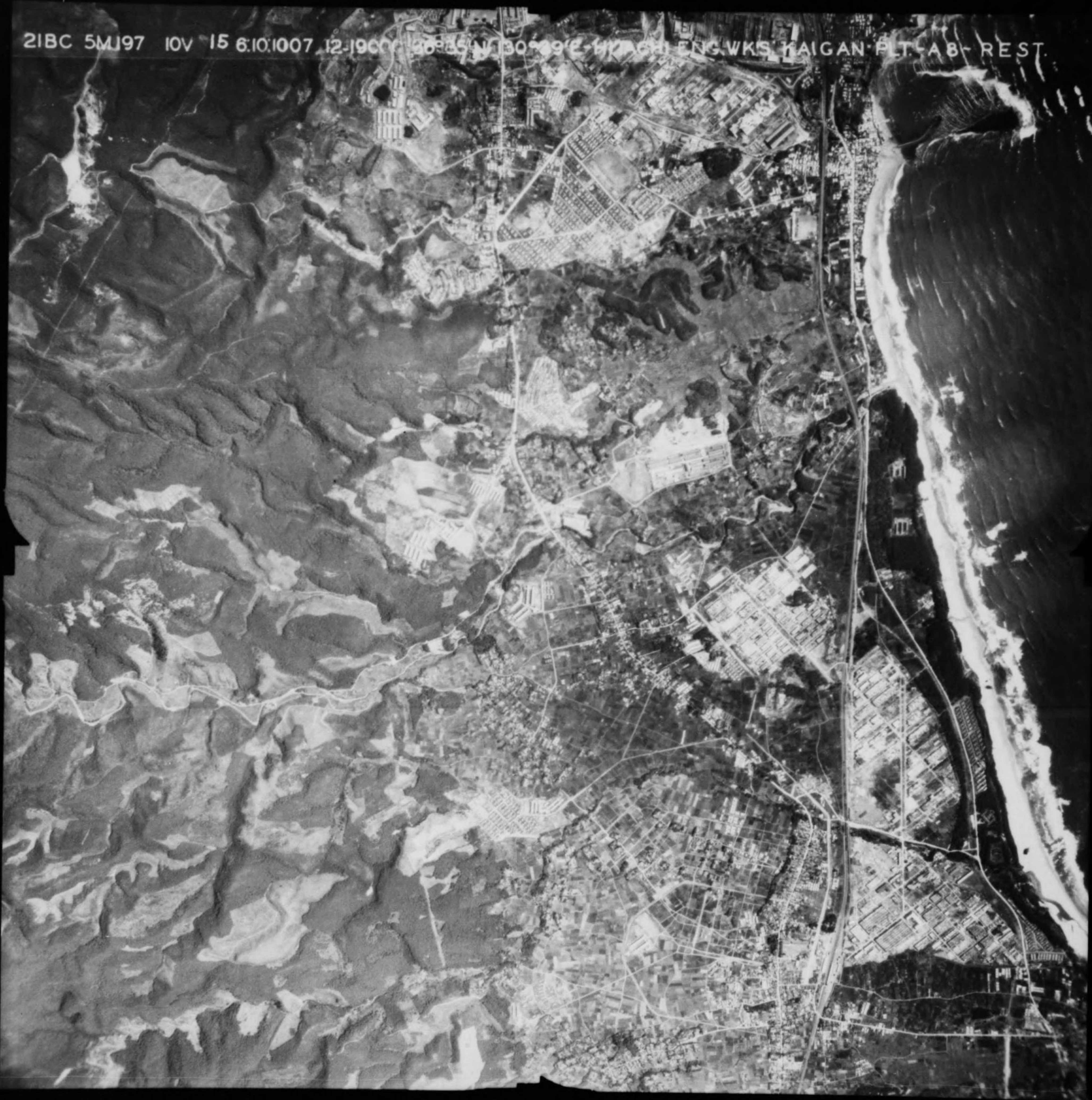


21BC 5M197 10V 16 6:10:007 12-19000 36°35'N 130°39'E-HITACHI ENG. WKS. KAIGAN FT. - A B - REST.





21BC 5MJ97 10V 15 6.10.1007 12-19000 36°35'N 130°09'E - HAIGAN ENG WKS HAIGAN FLT LAB - REST





S E C R E T

MISSION SUMMARY

Mission Number 197

28 June 1945

1. Date: 10 June 1945
2. Target: Nakajima Aircraft Co. at Musashino (PV) (90.17-357)  
Hitachi Engine Works Kaigan Plant (PR) (90.17 - 2009)
3. Participating Unit: 73rd Bombardment Wing
4. Number A/C Airborne: 124
5. % A/C Bombing Primary: (PR) 95.11% (118 radar and 2 opportunity)
6. Type of Bombs and Fuzes: AN-M66, 2000#-general purpose,  
variable delay nose and 1/40 sec.  
delay tail.
7. Tons of Bombs Dropped: 806 tons on primary radar and 14 on  
opportunity.
8. Time Over Primary: (PR) 0957K - 1038K
9. Altitude of Attack: 19,600 - 21,200 feet
10. Weather Over Radar Target: 2/10 - 3/10
11. Total A/C Lost: 0
12. Resume of Mission: Strike report photographs indicated excellent bombing results, with approximately 85 per cent of target destroyed. Reinforced concrete buildings at center of eastern edge of target sustained at least 10 direct hits. Internal damage impossible to assess, but it is believed to be severe. All other major buildings gutted or destroyed. Flak (at radar) was heavy, meager to moderate and occasionally accurate. Flak damaged 19 B-29's. Approximately 50 P-51's met the first B-29 Groups over Aoga Shima and escorted them to target area. Forty-five E/A sighted made 41 attacks. Claims not available. Eighteen B-29's landed at Iwo Jima. Average bomb load: 14,352 lbs. Average fuel reserve: 631 gallons.

S E C R E T



21BC 5M197 2V 5 8 10 0957 24 19 000 36° 35' N 130° 30' E HITACHI ENG WKS. KAGAN ALT. A44 REST





PHOTO 125 10 0957 2499000 36° 35' N 138° 39' E HITACHI NO WKS. KAIKAN PLT. A44-RE51





ZIBC 5M197 6V 14 6-10-0957 24-19000 36°55'N 139°39'E MTACHI ENG. WK'S, KAIGAN PLT. A51 REST.





21BC 5M197 25V 6 6-10-1038 24-20200 36° 35' N 130° 39' E HITACHI ENG. WK'S, KAIGAN PLT. Z39 REST.





21BC 5M197 25VT 6-10-1038 24-20200 36°35'N130°39'E HITACHI ENG. WK'S, KAIGAN PLT. Z39 REST.





109

XXIB

RESTRICTED



7471 EASTMAN KODAK SAFETY





RESTRICTED

RESTRICTED

RESTRICTED



3PR5M181-3L:

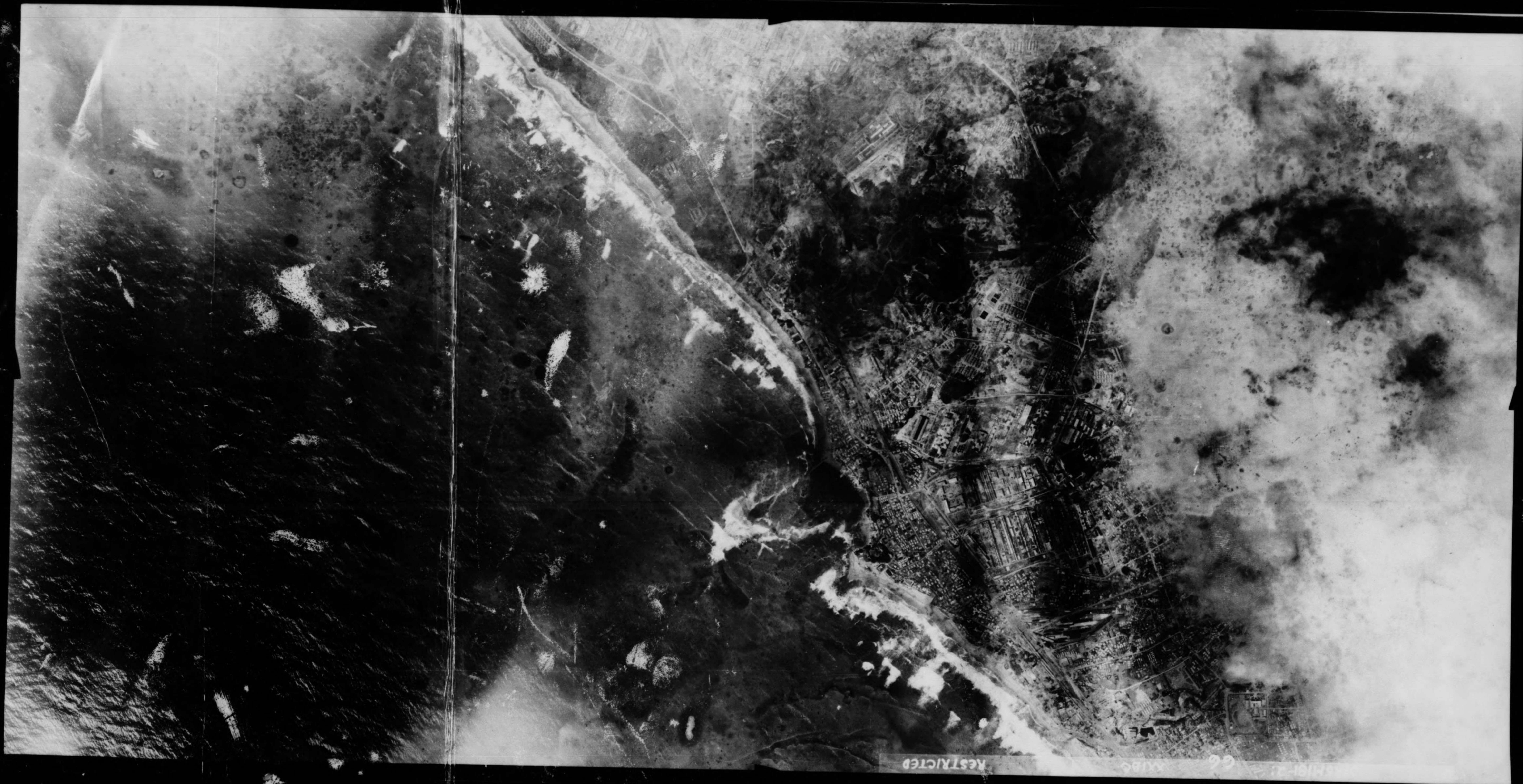
XXIBC

RESTRICTED

3PR5M181-3L: 110-XXIB. e. 4:30: 1019K-40" 31500 - 3533N 14008E/  
3635N 14032E  
RESTRICTED







RESTRICTED



REF ID: A66000

RESTRICTED

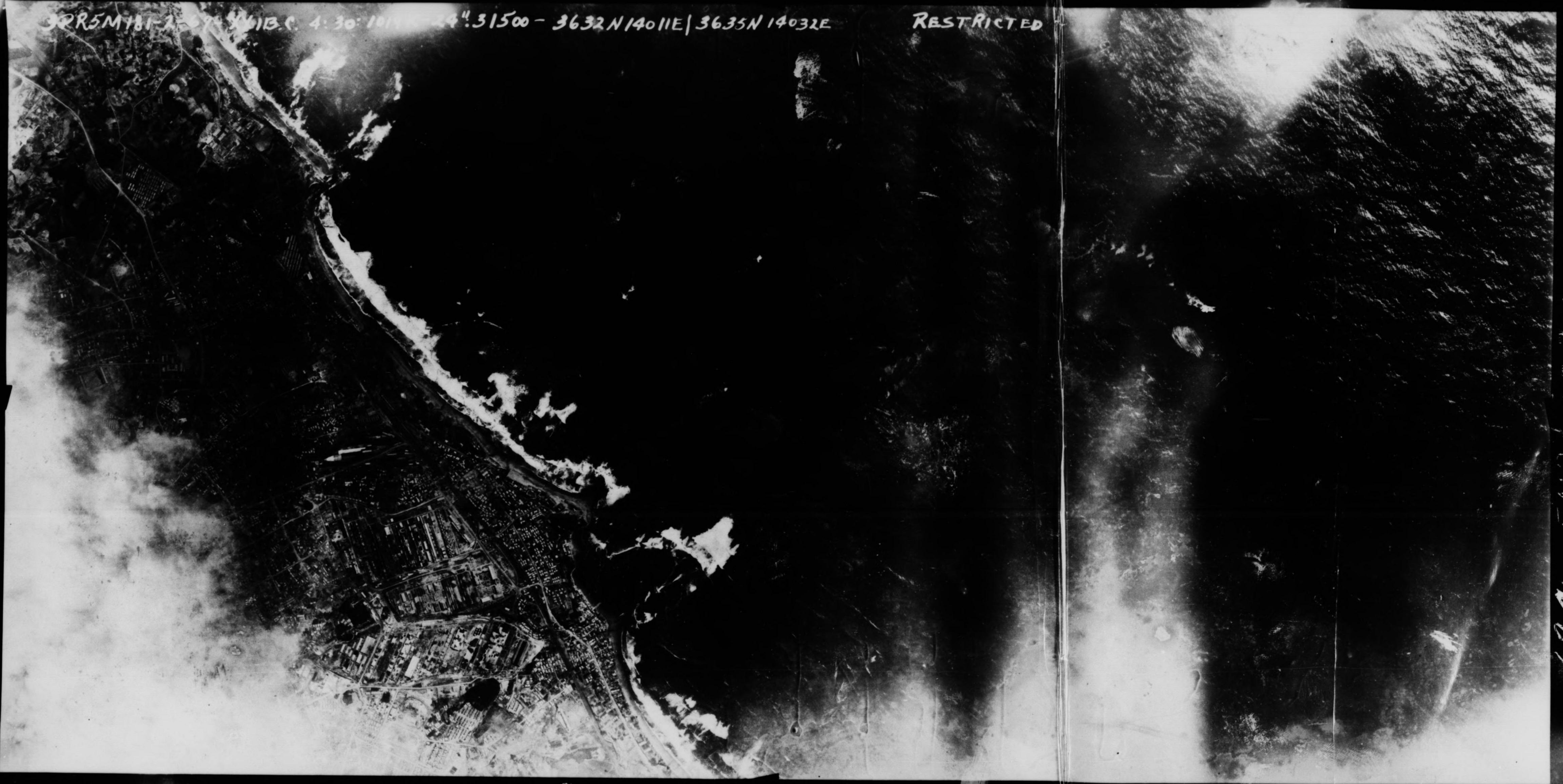


67A



3RR5M181-257 5413 C. 4:30:1011 24" 31500 - 3632N 14011E | 3635N 14032E

RESTRICTED



674 EMD





TARGET NO 90.14-1476 NÁMEHICHI ENGINEERING CO.,  
MÁIGAN PLANT

DATE 9 June 45 P/4  
COMPLETED

APPROX. COORD. 36°35' N 140°09' E PHOTO DATE 6 Apr 45

SCALE 1/6,000

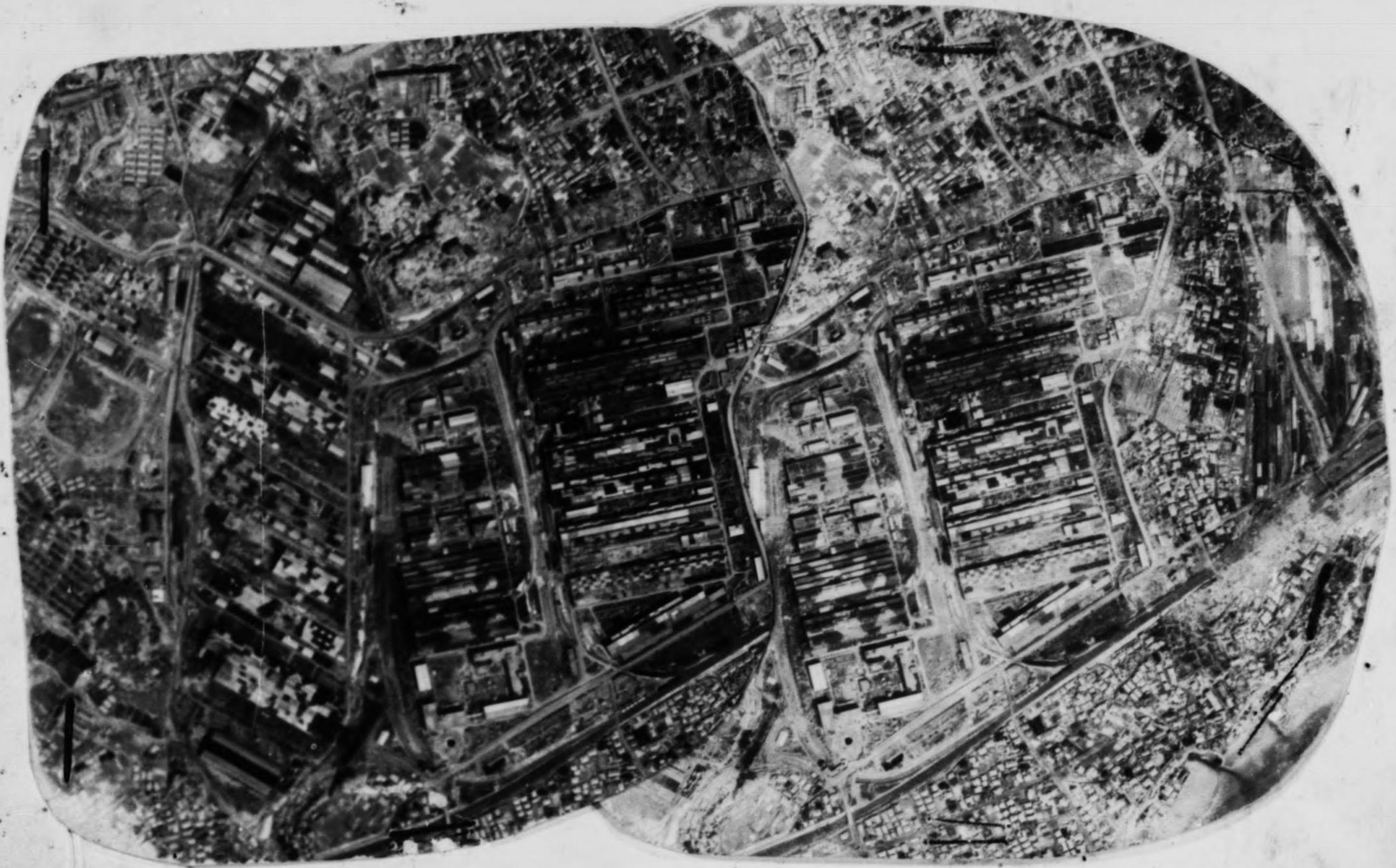
F/A NO. 146  
CFL 750.077

SORTED PRINT NOS. 3PR/5M118-3L:46-47

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(1476) - Pre-Raid, Mission 197



21 BC SM 197 - 2V:8 (10 June 45)  
A/C A44 (9750) .001' = 9.60'

21 BC SM 197 - 8V:13 (10 June 45)  
A/C A51 (9913) .001' = 9.60'

Bearing = 318°  
420



21 PR SM 118 - 3L (6 April 45)  
.001' = 9.50'

(45)



(46)



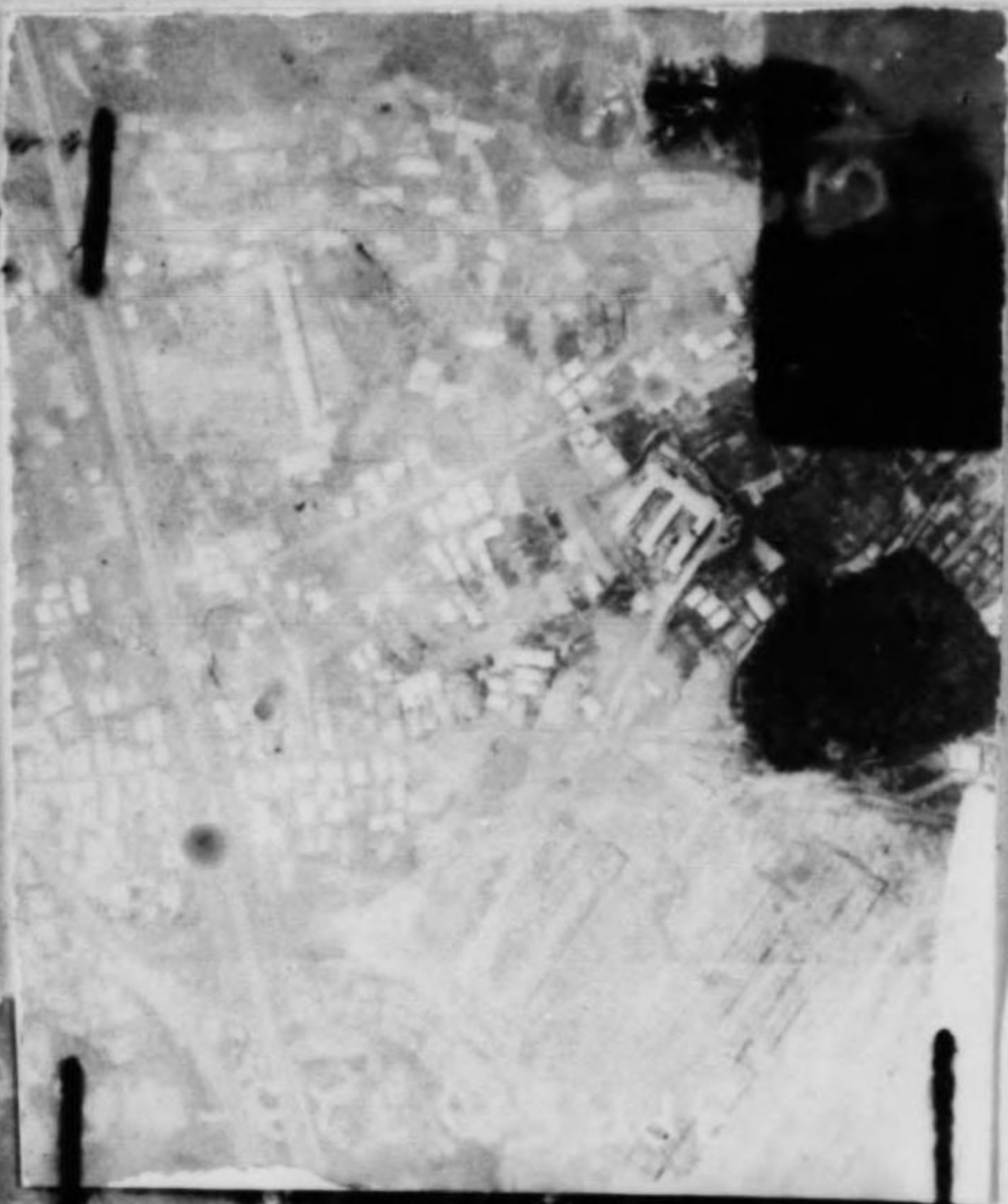
Shadow scale: .001' (shadow) = 13.6' (Height)

(47)



3PR5M 323-4R (5 July 45)

.001' = 8.68'



(148)

3PR5M 323-4L (5 July 45)

.001' = 8.68'



(149)



(147b)



(150)



(149)

(1476)

Post-Raid, Mission 197







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Strike Attack Report No. 105, cont'd.

Photos received:

XXI DC 5M 197--1V5-7; 1V16, 18, 20, 22	XXI DC 5M 197--15V2; 3, 10, 12
" " " " 2V2; 3; 8-11	" " " " 16V2; 6-8
" " " " 3V15, 16	" " " " 17V2; 6; 8; 15
" " " " 4V2; 3, 9, 10	" " " " 18V2; 6; 8, 10, 20
" " " " 5V2; 10, 11	" " " " 19V8; 11
" " " " 6V2; 3, 6	" " " " 20V2; 3, 6, 8
" " " " 7V8-10	" " " " 22V10; 13, 14
" " " " 8V10, 11, 14	" " " " 23V30, 32
" " " " 9V2; 3, 5-7	" " " " 24V77-79
" " " " 10V10, 11, 17, 19	" " " " 26V2; 5; 6, 13
" " " " 11V3; 7; 8	" " " " 27V2; 3, 4
" " " " 12V2; 6; 7	" " " " 28V73
" " " " 13V2; 6, 7	" " " " 29V6; 7, 11, 13
" " " " 14V11, 14, 15	" " " " 31V1, 9-11

Annotated and attached: one bomb fall plot.

This report received from 73rd Bombardment Wing, XXI Bomber Command and approved and reproduced by CIU, XXI Bomber Command

Approved *Robert K. Bass* Capt. AC  
for HAMILTON D. DAREY  
MAJOR, AC

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TARGET 90.14-1476  
XXI BOM. COM. MISSION 197  
10 JUNE 1945  
STRIKE ATTACK REPORT 105  
C.I.U.-XXI BOM. COM.  
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BOMB PLOT  
HITACHI ENGINEERING WORKS  
12-75  
10 JUNE 1945

● VISIBLE HITS  
○ PROBABLE HITS





Target 1476

Plotted Bombs in Target Area

<u>Zone</u>	<u>No. Bombs</u>	
1	27	31
2	49	55
3	53	61
4	31	45
5	39	49
6	30	31
7	21	32
8	16	21
9	14	16
<u>Total</u>	<u>280</u>	<u>341</u>

$$F = \frac{1719.6}{2080.8} = 0.828$$

$$D = \frac{341}{150} = 2.27 \text{ tons/acre}$$

$$M \text{ (from slide rule)} = \underline{0.77} \text{ acres/ton}$$



FO 85

Wing	Force	Primary	Secondary	Mission
<del>58</del>		<del>2097</del>	<del>PR - Kasumigaura</del>	
58	1 Gp.	2097	PR - Kasumigaura <sup>(1491)</sup> Scaplan Bot	195
58	1 Gp	1391	PR - 1391	196
73	All A/c	357	PR - 1476	197
314	1 Gp	2145	PR - 2145	198
314	2 Gp.	356	PR - Kasumigaura <sup>(1491)</sup> S. B.	199
314	1 Gp.	2008	PR - 2008	200

From the times of release (and the strike-fotos from the 1<sup>st</sup> formation over the target of the 73<sup>rd</sup> wing) it is evident that ~~no~~ no A/c from the 314<sup>th</sup> Wg, except the 1 A/c from the 330<sup>th</sup> Gp which did bomb with the 73 Wg, could have bombed target 1476. ∴ Missions 198, 199, 200 (except for 1 A/c from Mission 199) did not make runs on 1476.

Strike fotos from Mission 196 (A/c 4892) shows run was actually made on target 1391 ≠ not on 1476.

Strike fotos from Mission 195 (A/c 9698, 1542 & 4739) shows run was actually made on target 1491 ≠ not on 1476.

Search of Missions (XXI Bc) up to 3PR5M323 Photo Mission shows no evidence of further strikes against this target.



Photo Mission	Scale from altitude & focal length .001' =	Scale from Imp. Jap Map of 1/50,000 .001' =	Fixed Distance on Prints in .001's	Distance in feet	Scale to use for photos .001' =	
3PRSM 181-2	15.7'		158	2480'	15.8'	
			16.0'	158		2530'
			16.1'	158		2540'
21BCSM 197-2V	9.50'		260	2470'	9.60'	
			9.42'	260		2450'
21BCSM 197-8V	9.50'		260	2470'	9.60'	
			9.60'	260		2500'
21BCSM 197-25V	10.1'		252	2540'	9.92'	
			10.2'	252		2570'
3PRSM 118-3L		9.56'	263	2510'	9.50'	
3PRSM 181-3L	9.45'		<del>265</del>	2490'	9.46'	
			9.39'	264		2480'
3PRSM 323-4R		8.70'	<del>288</del> 288	2510'	8.68'	
3PRSM 323-4L		8.65'	288	2490'	8.68'	
			Average =	<u>2502'</u>		



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HEADQUARTERS XXI BOMBER COMMAND  
OPERATIONS ANALYSIS SECTION

INDUSTRIAL DAMAGE SCHEDULE  
FOR  
WEAPON ANALYSIS

NAME OF TARGET: HITACHI ENGINEERING CO., KAIGAN PLANT

LOCATION: MITO (90.14)

PHOTO COVER USED					MISSION NO: 197	TARGET NO
MISSION	PRINTS		DATE	QUALITY	SCALE	ATTACK DATE: 10 June 45
	PRE-STRIKE	POST-STRIKE				REPORT DATE:
BR 5M11E	3L: 45, 46, 47		6 April 45	Excellent	1/9500	90.14
BR 5M12B		4R: 148-150	5 July 45	"	1/8680	1476
"		4L: 148-150	"	"	"	
ENLARGEMENT NO:					SHADOW SCALE:	
					LAT.: 36° 35' N	LONG.: 140° 39' E
					SHEET NO 1 OF 6 SHEETS	

BUILDINGS				AREAS OF VISIBLE DAMAGE									DESCRIPTION OF DAMAGE	
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ. FT.	STRUCTURAL				SUPERFICIAL				OLD DAMG NOT REPD		
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1		35' x 95'	3.3											Undamaged.
2		35' x 124'	4.3	✓										"
3		35' x 116'	4.1	✓	1.3			0.7						Contents probably 30% small damaged.
4		31' x 152'	4.7	✓										Roof slightly disturbed
5		30' x 130'	3.9											"
6		35' x 100'	3.5											Some roofing blown off. Content damage probably negligible
7		35' x 100'	3.5											Content damage 75%
8		38' x 200'	7.6	✓	7.6									Bldg. pulled in towards east end. Content damage 100%
9		38' x 90'	3.4											Undamaged
10		52' x 147'	7.6	✓				1.0						Some roofing blown off. Content damage negligible.
11		52' x 133'	6.9	✓				0.3						"
12		133' x 260'	34.6	✓	25.3			9.3						Content damage 75%
13		52' x 175'	9.1	✓	9.1									Bldg. pulled in towards east end. Content damage 50%
14		50' x 40'	2.0											Content damage 100%
15		50' x 70'	3.5											Content damage 25%
16		52' x 170'	8.8	✓	8.8			8.8						Content damage 100%
17		31' x 140' + 31' x 210' + 17' x 85'	12.3	✓	12.3									"
18		35' x 59'	2.1											"
SUB-TOTALS														
GRAND TOTALS														

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35PTU 25-15-2



(CONFIDENTIAL)

HEADQUARTERS XXI BOMBER COMMAND  
OPERATIONS ANALYSIS SECTION

TARGET No 1476

MISSION No 197

SHEET 2 OF 6 SHEETS

BUILDINGS				AREAS OF VISIBLE DAMAGE								OLD DAMAGE NOT REPAIRED	DESCRIPTION OF DAMAGE	
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ.FT.	STRUCTURAL				SUPERFICIAL						
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
SUB-TOTALS BROUGHT FORD														
19		57' x 165'	9.4	✓	9.4									Content damage 50%
21		32' x 138'	4.6	✓	4.6									Content damage 100%
<del>22</del>		<del>27' x 100'</del>	<del>2.7</del>											" " 50%
23	}	38' x 90'	8.9	✓	8.9									" " 100%
24		52' x 105'												
25		52' x 135'	7.0	✓	7.0									" " 100%
26		52' x 135'	7.0	✓	7.0									" " 100%
27		100' x 390'	39.0	✓	39.0									" " 100%
28		100' x 340'	34.0	✓	34.0									" " 100%
<del>29</del>		<del>38' x 76'</del>	<del>2.9</del>											" " 100%
<del>30</del>		<del>34' x 90'</del>	<del>3.1</del>											" " 100%
31		100' x 340'	34.0	✓			34.0							" " 100%
32		38' x 170'	6.5	✓	6.5									" " 100%
33		68' x 340'	23.1	✓	23.1									
34		61' x 275'	16.8	✓	16.8									
35		65' x 70'	4.6	✓	4.6									
36		68' x 450'	30.6	✓	30.6									
37		70' x 200'	14.0	✓	14.0									
38		38' x 200'	7.6	✓	7.6									
<del>39</del>		<del>38' x 90'</del>	<del>3.4</del>											
40		38' x 285'	10.8	✓	10.8									
<del>41</del>		<del>38' x 85'</del>	<del>3.2</del>											
42		135' x 340'	45.9	✓			45.9							
43		65' x 65'	4.2	✓	4.2									
<del>44</del>		<del>30' x 65' + 40' x 40'</del>	<del>3.6</del>											
45		100' x 330'	33.0	✓	33.0									
46		100' x 210'	21.0	✓	21.0									
SUB-TOTALS														
GRAND TOTALS														

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35PTU 25-6-45-2A



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HEADQUARTERS TWENTIETH AIR FORCE  
OPERATIONS ANALYSIS SECTION

TARGET No 1476

MISSION No 197

SHEET 3 OF 6 SHEETS

BUILDINGS				AREAS OF VISIBLE DAMAGE								OLD DAMAGE NOT REPAIRED	DESCRIPTION OF DAMAGE	
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ.FT.	STRUCTURAL				SUPERFICIAL						
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
SUB-TOTALS BROUGHT FORD														
47		39' x 165'	6.3 ✓	6.3										
48		28' x 95'	3.6											
49		38' x 185'	7.0 ✓	7.0										
50		38' x 57'	2.2											
51		120' x 740' + 115' x 645' S	163.0 ✓	163.0										
54		39' x 62'	2.4											
55		29' x 75'	2.2											
56		160' x 375'	60.0 ✓	36.0				8.4						
57		52' x 160'	8.3 ✓											
58		38' x 85'	3.2											
59		70' x 62' + 70' x 200' S	18.3 ✓	4.3										2 stories } Plan areas given
61		70' x 205'	14.4 ✓	6.7				7.7						11
62		70' x 175' + 70' x 220'	27.7 ✓	8.5				4.2						11
63		70' x 133'	9.3 ✓					9.3						
64		147' x 500'	73.5 ✓	73.5										
65		200' x 500'	100.0 ✓	100.0										
66		38' x 135'	5.1 ✓	5.1										
67		38' x 147'	5.6 ✓	5.6										
68		65' x 130'	8.4 ✓	8.4										
70		65' x 115'	7.5 ✓	7.5										
71		65' x 115'	7.5 ✓	7.5										
72		33' x 88'	2.9											
73		65' x 130'	8.4 ✓	8.4										
74		195' x 395'	77.0 ✓	77.0										
75		57' x 100' + 29' x 85' S	8.2 ✓	8.2										
SUB-TOTALS														
GRAND TOTALS														

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HEADQUARTERS TWENTIETH AIR FORCE  
OPERATIONS ANALYSIS SECTION

TARGET No 1476

MISSION No 197

SHEET 4 OF 6 SHEETS

BUILDINGS				AREAS OF VISIBLE DAMAGE								OLD DAMAGE NOT REPAIRED	DESCRIPTION OF DAMAGE
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ.FT.	STRUCTURAL				SUPERFICIAL					
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
SUB-TOTALS BROUGHT FORD													
<del>77</del>		<del>29' x 100'</del>	<del>2.9</del>										
79		41' x 127'	5.2 ✓	5.2									
<del>80</del>		<del>48' x 48'</del>	<del>2.3</del>										
<del>81</del>		<del>48' x 48'</del>	<del>2.3</del>										
82		65' x 130"	8.4 ✓	8.4									
83		65' x 130' + 29' x 105' }	11.5 ✓	11.5									
<del>84</del>		<del>33' x 75'</del>	<del>2.5</del>										
<del>85</del>		<del>33' x 105'</del>	<del>3.5</del>										
<del>86</del>		<del>33' x 105'</del>	<del>3.5</del>										
<del>87</del>		<del>33' x 67'</del>	<del>2.2</del>										
88		33' x 123'	4.1 ✓	4.1									
<del>89</del>		<del>38' x 75'</del>	<del>2.8</del>										
90		48' x 200'	9.6 ✓	9.6									
91		48' x 175'	8.4 ✓			8.4							
<del>92</del>		<del>29' x 120'</del>	<del>3.5</del>										
<del>93</del>		<del>29' x 95'</del>	<del>2.8</del>										
<del>94</del>		<del>38' x 60'</del>	<del>2.3</del>										
<del>95</del>		<del>46' x 105'</del>	<del>2.7</del>										
97		47' x 285'	13.4 ✓			10.5							
98		47' x 200'	9.4 ✓	9.4									
<del>99</del>		<del>33' x 100'</del>	<del>3.3</del>										
100		40' x 100'	4.0 ✓	4.0									
102		47' x 150'	7.0 ✓			7.0							
<del>103</del>		<del>30' x 100'</del>	<del>3.0</del>										
104		33' x 210'	6.9 ✓										
105		38' x 150'	5.7 ✓	5.7									
SUB-TOTALS													
GRAND TOTALS													

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HEADQUARTERS TWENTIETH AIR FORCE  
OPERATIONS ANALYSIS SECTION

TARGET No 1476

MISSION No 197

SHEET 5 OF 6 SHEETS

BUILDINGS				AREAS OF VISIBLE DAMAGE								OLD DAMAGE NOT REPAIRED	DESCRIPTION OF DAMAGE	
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ.FT.	STRUCTURAL				SUPERFICIAL						
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
SUB-TOTALS BROUGHT FORD														
106		488' x 320'	15.4 ✓	15.4										
107		52' x 105'	5.5 ✓	5.5										
108		40' x 40' + } 30' x 85' }	4.2 ✓	4.2										
109		130' x 505'	65.6 ✓	45.5				20.1						
111		50' x 83'	4.2 ✓			4.2								
<del>112</del>		<del>33' x 81'</del>	<del>2.7</del>											
113		33' x 123'	4.1 ✓	4.1										
<del>114</del>		<del>4' x 76'</del>	<del>2.0</del>											
<del>115</del>		<del>30' x 50'</del>	<del>2.5</del>											
<del>116</del>		<del>40' x 75'</del>	<del>3.0</del>											
<del>117</del>		<del>33' x 96'</del>	<del>3.2</del>											
118		160' x 840'	134.4 ✓			134.4								
120		51' x 115' + } 40' x 60' + } 29' x 240' }	15.7 ✓	15.7										
121		29' x 185'	5.4 ✓	5.4										
123		69' x 125'	8.6 ✓	8.6										
124		29' x 143' } Irreg.	4.1 ✓										2 Stories	
<del>125</del>		<del>Irreg.</del>	<del>4.5 ✓</del>											
<del>126</del>		<del>36' x 70'</del>	<del>2.5</del>											
<del>127</del>		<del>17' x 53'</del>	<del>2.5</del>											
<del>130</del>		<del>38' x 67'</del>	<del>2.5</del>											
131		290' x 740'	214.6 ✓	168.9				45.7						
<del>132</del>		<del>211' x 150'</del>	<del>3.1</del>											
133		38' x 155'	5.9 ✓			5.9								
<del>135</del>		<del>38' x 80'</del>	<del>3.0</del>											
SUB-TOTALS														
GRAND TOTALS														

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459.9

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TARGET NO 1476

HEADQUARTERS TWENTIETH AIR FORCE  
OPERATIONS ANALYSIS SECTION

MISSION NO

SHEET 1 OF 3 SHEETS

BUILDINGS				AREAS OF VISIBLE DAMAGE								OLD DAMAGE NOT REPAIRED	DESCRIPTION OF DAMAGE
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ.FT.	STRUCTURAL				SUPERFICIAL					
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
SUB-TOTALS BROUGHT FORD													
3				1.5				.6					
6								1.6					
7				2.7				1.1					
8				7.6									
10								.9					
11								.2					
12				26.7				4.4					
13				8.4									
14				1.3				.4					
15				1.0				.9					
16						8.8							
19				12.3									
18				1.9									
19				9.4									
21				4.5									
22				2.7									
24						5.4							
25				7.0									
26						7.0							
27						39.0							
28						34.0							
29						2.8							
30				3.0									
31						34.0							
32				6.4									
33				23.1									
34						16.7							
35				4.5									
36						30.6							
37				14.0									
38						7.6							
39						3.4							
40				10.8									
41				3.2									
42						26.5				19.4			
43								4.2					
44								1.8					
45				33.0									
46						22.9							
47						5.7							
48				2.9									
49				5.6									
50				2.3									
51				135.1				29.3					
55				1.5									
56				37.7				9.6					
SUB-TOTALS													
GRAND TOTALS													

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HEADQUARTERS TWENTIETH AIR FORCE  
OPERATIONS ANALYSIS SECTION

TARGET NO

MISSION NO

SHEET  OF 3 SHEETS

BUILDINGS				AREAS OF VISIBLE DAMAGE								OLD DAMAGE NOT REPAIRED	DESCRIPTION OF DAMAGE
NUMBER	SUB-DIV.	OCCUPANCY	AREA 1000 SQ.FT.	STRUCTURAL				SUPERFICIAL					
				H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN	H.E.	FIRE	H.E. + FIRE	CAUSE NOT KNOWN		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
SUB-TOTALS BROUGHT FORD													
58		76 x 36	2.7					1.8					
59		194 x 76	14.0	4.7									
		76 x 58	4.4										
61		218 x 76	16.5	6.8				9.1					
62		218 x 66	14.3	9.4									
		171 x 66	11.2										
63		133 x 66	8.7					8.8					
64		490 x 161	79.0			41.4				37.6			
65		490 x 191	97.6			35.0				62.6			
67		152 x 38	5.7	5.7									
66		114 x 38	4.3	4.3									
68		133 x 50	6.6	6.6									
69		185 x 33	2.8	2.8									
70		118 x 76	8.9	8.9									
71		118 x 66	7.8	7.8									
73		133 x 66	8.8	8.8									
74		326 x 195	63.5			63.5							
		81 x 105	8.1			8.1							
		95 x 57	5.4			5.4							
77		86 x 33	2.8	2.8									
		33 x 19	.6	.6									
		24 x 15	.4	.4									
99		128 x 43	5.5	5.5									
80		52 x 52	2.7	2.7									
81		52 x 48	2.4	2.4									
82		128 x 75	9.6	9.6									
83		133 x 62	8.3	8.3									
		105 x 28	2.9	2.9									
84		70 x 30	2.1	2.1									
85		105 x 28	2.9	2.9									
86		95 x 30	2.8	2.8									
90		190 x 57	10.8	3.9				6.9					
91		171 x 57	9.7			9.7							
97		225 x 43	11.6			8.4							
98		200 x 43	8.6			8.6							
99		100 x 45	4.5			4.5							
102		140 x 52	7.3			7.3							
104		215 x 28	6.0										
105		142 x 38	5.4			5.2							
106		308 x 45	13.9	13.9									
107		100 x 42	4.2	4.2									
109		510 x 135	66.8	20.5		18.8		5.5		9.6			
		62 x 20	1.2										
111		47 x 33	1.5			1.5							
118		740 x 101	128.0			80.0				51.7			
		123 x 38	4.7										
120		240 x 28	6.7	15.7									
		114 x 52	5.9										
		66 x 47	3.1										
121		190 x 28	5.3	5.3									
123		128 x 71	9.0			9.0							
124		85 x 28	2.3										
		66 x 28	1.8										
125		85 x 60	5.6										
SUB-TOTALS													
GRAND TOTALS													

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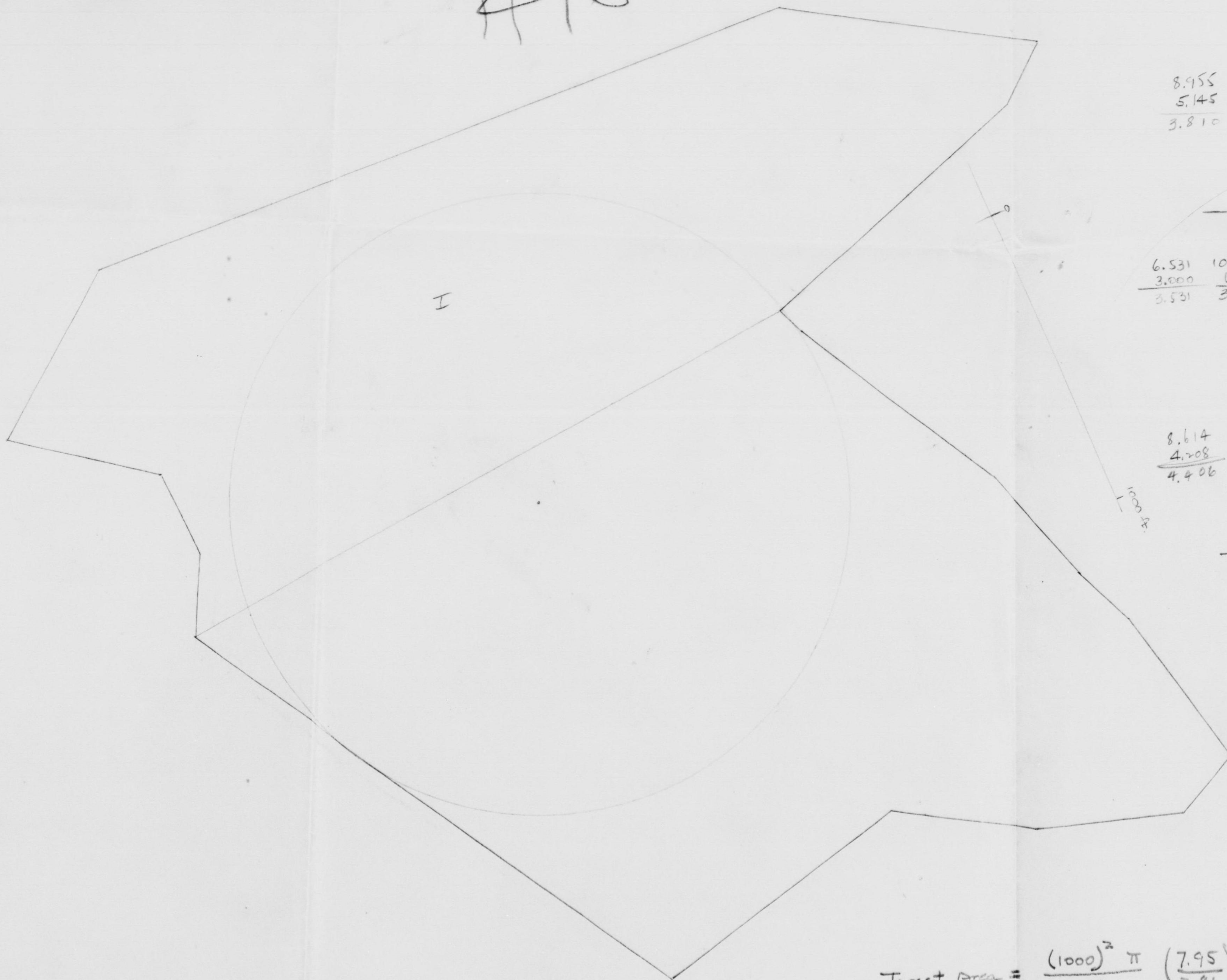
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1000' @

8.955	12.767	6.576
5.145	8.955	2.767
3.810	3.812	3.809
ave. = 3.81		

Area I

6.531	10.069	3.595
3.000	6.531	0.069
3.531	3.538	3.526
ave. = 3.53		

Area II

8.614	13.037	7.453
4.208	8.614	3.037
4.406	4.423	4.416
ave. = 4.42		

Total (I+II) = 7.95

$$\text{Target Area} = \frac{(1000)^2 \pi}{43560} \left( \frac{7.95}{3.81} \right) = 150 \text{ acres}$$



*Return to  
Industry  
file*

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PHOTO INTELLIGENCE SECTION  
EVALUATION BRANCH  
PHOTOGRAPHIC DIVISION  
AC/AS, INTELLIGENCE

FUNCTIONAL ANALYSIS REPORT NO. F/A-146  
Date 5 June 1945

TARGET NO: 90:14-1476  
NAME OF TARGET: HITACHI ENGINEERING CO: (KAIGAN PLANT)  
LOCATION: SUKEGAWA, HONSHU, JAPAN. COORDINATES: 36°35'N-140°39'E  
PHOTOGRAPHY: 

<u>DATE</u>	<u>MISSION</u>	<u>PRINT NOS.</u>
6 APR 45	3PR/5M118	3L.46/47 2V.32/33

1. This report has been prepared from a study of aerial photographs and a consideration of evaluated ground information supplied by the JOINT TARGET GROUP.

2. FUNCTION:

The KAIGAN plant of the HITACHI ENGINEERING CO: is the largest of the three HITACHI plants in the vicinity and is reported to produce all types of heavy electrical machinery, marine turbines, elevators, conveyors, electric locomotive parts, DIESEL engines and boilers.

Ground reports indicate that the pre-war production of generators and power plant machinery represented 31% and 40% respectively of Japan's total output of this class of machinery.

The plant has been greatly extended during the past few years. It is divided into three distinct areas, the westerly of which has been constructed since the outbreak of war. A fourth area to the North of the new area is believed to be part of the plant, but there is no direct confirmation of this.

Very little ground information is available regarding the work carried on in the various buildings and the functions allotted to them are almost exclusively the result of photographic interpretation.

The many large buildings, the stockyards, gantry cranes and the internal rail tracks serving many of the buildings confirm to a great extent the reports that the plant produces heavy electrical and other machinery.

Ground reports that the plant produces tanks are not confirmed by photography, there being no evidence of this. This fact, however, does not preclude the possibility of tank components being manufactured for shipment to tank assembly plants elsewhere.

3. LOCATION:

The target is located to the South of HITACHI CITY about 1/2 mile SW of SUKEGAWA railway station and within 300 yards of the coast.

4. SERVICES:

The MITO/ONAHAMA railway runs parallel with the eastern boundary of the site and two spurs run from the main line into the plant area. The plant is also served by a spur from the electric railway running to the two HITACHI plants to the North.

Good roads encircle the plant and probably serve for the transport of material between the three plants.

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5. IDENTIFICATION OF FACILITIES:

<u>Building</u>	<u>Occupancy</u>
<u>Area "A"</u>	
1.	Storage
2.	Storage
3,4.	Storage
5.	Unidentified
6,7.	Storage
8.	Possible pattern store
9.	Storage
10.	Possible heat treatment shop
11.	Storage
12.	Possible light metal casting foundry
13.	Workshop
 <u>Area "B"</u>	
14-18.	Storage
19.	Covered stock yard.
20.	Stock yard with heavy gantry crane
21-26.	Storage
27,28.	Machine shop
29,30.	Storage
31.	Assembly
32.	Storage
33,34.	Machine shop
35.	Probable test shop.
36-40.	Machine shop.
41.	Storage
42.	Assembly
43.	Probable test shop
44.	Storage
45,46.	Machine shop
47-50.	Storage
51.	Heavy castings foundry
52.	Stock yard
53.	Gantry crane
54,55.	Storage
56.	Probable foundry
57.	Probable pattern shop
 <u>Area "C"</u>	
58.	Unidentified
59.	Probable administrative offices
60.	Unidentified
61.	Probable offices
62.	Probable drawing & technical offices
63.	Unidentified
64.	Heavy castings foundry
65a.	Machine shop
b.	Machine shop
c.	Probable press shop and forge
66,67.	Storage
68.	Unidentified
69.	Under construction
70-73.	Unidentified
74.	Assembly
75-84.	Unidentified
85, 86.	Storage

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5. IDENTIFICATION OF FACILITIES: (Cont'd)

87-93.	Storage
94.	Transformer maintenance shop
95.	Switch house
96.	Open air transformers and breakers
97, 98	Storage
99.	Probable switch house
100.	Shop
101.	Transformer house
102.	Storage
103.	Heat treatment shop
104, 105	Unidentified
106-108.	Storage
109.	Reported small transformer assembly shop
110.	Stockyard
111.	Unidentified
112-114.	Storage
115, 116.	Boiler house
117.	Probable Diesel engine house
118.	Reported large transformer assembly shop
119.	Pump house and water filters.
120, 121	Storage
122.	Stock yard
123.	Shop
124, 125.	Offices
126, 127.	Unidentified
128.	Stockyard.
129.	Large gantry crane
130.	Unidentified
131.	Reported turbine shop
132-135.	Storage
136.	Probable motor and switch gear assembly
137, 138.	Pattern shop
139.	Boiler house
140.	Large castings foundry
141.	Storage
142.	Probable material stores
143.	Storage

6. DISCUSSION:

The majority of the buildings in all areas of the plant have been camouflaged with disruptive painting and considerable numbers of shelter trenches have been provided in the space available.

7. ACTIVITY:

Evidence that the plant is active is furnished by the quantity of material seen in the various stockyards, the presence of trucks and RR cars about the site and smoke issuing from a stack over a building in Area A.

ENCL: CFL 750.077

INTERPRETED BY:

G. A. ANDERSON  
F/Lt. R.A.F.

JTG CONSULTANT

R. C. DIXON

APPROVED BY:

*Lee W. Kilgore*

LEE W. KILGORE  
Major, Air Corps  
Chief, Evaluation Branch  
Photographic Division  
Office of Asst Chief of Air Staff,  
Intelligence



This mission Secondary Target to 357-NAKAJIMA

Target 90:14 - 1476 Hatachi Engineering Works Kaigan Plant

Mission 197 10 June 45

Wing Bombing 73rd Aircraft Airborne 124 (1 Wg)  
Aircraft Bombing Primary 118

Type Bombs: AN M66 2000lb

Type Fuzing: Nose, .025, tail, .025  
Tons Airborne: 866.0  
Tons Released over target: 806.0  
Altitude Release: Low 19600  
High 21200

Type Bombing: Visual 118  
Radar 0

Aiming Point: 1  
Axis of Attack  
Formations Bombing:  
Bursts on target: 553  
Visual Hits: 629  
Computed Hits: 191

Bombing Accuracy:

0' to 1000'	1000' to 2000'	2000' to 3000'
559 - 73.7%	205 - 25.0%	11 - 1.3%

Roof Area of Target: 2,213,104 sq ft

Destroyed	1,781,040 sq ft	80.5%
Gutted	<u>361,860 sq ft</u>	<u>16.3%</u>
Total	2,142,900 sq ft	96.8%

*Attack Data checked  
with map Miller  
ME*



Target: Hitachi Engine Wks., Kaigan Plant Target No: 1476

Location: (Machashiro) Suhegawa Mission Nos: 197

Coordinates:

Products: 14 types

Date of Attack	No. A/c	Type Bombing	Altitude	Bombs			
				Wt.	No.	Type	Fuzing
10 June 45	118	Radar.	20,500'	2000	806	GP	Var. - .025

N.B. This area was shelled after bombing. Many information not available. May not be serious fault.

Notes:

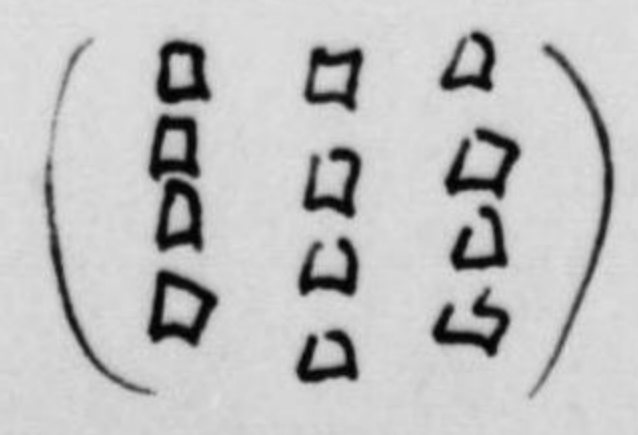
Target folder shows one attack, which was well concentrated on plant. Rough visual study (no stereo) of PR cones indicates target probably too heavily hit to make good study though some more or less isolated hits can probably be found.

\* Target should be interesting however if it is wished to study overall effect, i.e. number of bombs to destroy target?

Estimated 97% total area damaged.



P.I. Functional Analysis Available + amount of damage by bombing.





TARGET 1476 - HITACHI ENGINEERING WORKS.  
KAIGAN PLANT.

## PHYSICAL DAMAGE DIVISION.

### TABLE OF CONTENTS

- 1- OBJECT OF STUDY.
- 2- SUMMARY
- 3- GENERAL INFORMATION
- 4- ✓ DESCRIPTION OF THE TARGET ✓
- 5- DESCRIPTION OF THE ATTACK OR ATTACKS.
- 6- ANALYSIS OF THE DAMAGE
- 7- RECOMMENDATIONS AND CONCLUSIONS.



# 1. OBJECT OF STUDY -

THE HITACHI ENGINEERING WORKS WAS ONE OF THE LARGEST heavy electrical equipment manufacturing plants in Japan. On 10 June 1945 this important target was subjected to one saturation raid employing 2000# G.P. high explosive bombs.

A STUDY OF THIS TARGET, IN VIEW OF THE THE ENTIRE PLANT FACTOR OF  $\lambda$  HAVING BEEN COMPLETELY WITH ONE TYPE BOMB. KNOCKED OUT IN A SINGLE RAID, SHOULD REVEAL MUCH IMPORTANT INFORMATION.

STRIKE ATTACK PHOTOS SHOWED 85% OF THE TARGET AS BEING DESTROYED.

IN ADDITION, REINFORCED CONCRETE BUILDINGS AT THE CENTER OF THE EAST EDGE OF THE TARGET (REPRESENTING     % OF THE ROOF AREA OF THE TARGET) RECEIVED 10 (?) DIRECT HITS, WITH 2000# BOMBS. A DETAILED STUDY OF THESE BUILDING SHOULD ALSO BE OF GREAT VALUE,



#### 4. DESCRIPTION OF THE TARGET

The target is located to the south of Hitachi City approximately one-half mile south west of Sukegawa railway station and within 300 yards of the coast. The Mito-Onahama railway runs parallel with the eastern boundary of the plant site and two spurs run from the main line into the plant area. The plant is also served by a spur from the electric railway running ~~to~~ to the two Hitachi plants to the north.

The plant covers an irregular shaped area measuring roughly about 2500 ft. (?) north & south and 3000 ft. east-west. Total roof area is approx 2,213,100 sq ft. and the total number of buildings comprising the plant is 143. The plant is divided into 3 distinct areas, the westerly portion having been constructed since the outbreak of the war.

(additional info required - TYPE OF MANUFACTURES

- Importance to economy or war effort.

- ? Conversion to tanks & aircraft components)



5. DESCRIPTION OF ATTACK OR ATTACKS.

ON 10 JUNE 1945 THIS TARGET WAS  
ATTACKED BY 120 AIRCRAFT OF THE XXI  
Bomber Command, carrying a TOTAL OF  
867, 2000 lb. AN-M66 Bombs. 628 bombs  
were fuzed .025 second delay nose and tail  
and 238 were fuzed 0.10 sec delay nose and  
.025 second delay tail fuse.

THE BOMBING WAS VISUAL and from  
an altitude of 19,600 - 21,200 feet.



HITACHI ENGINEERING CO.  
90.14-1476

This plant (the Kaigan plant) is the largest of three Hitachi plants in the area and was reported to produce all types of heavy electrical machinery, marine turbines, elevators, conveyors, electric locomotive parts, diesel engines and boilers.

It is located to the south of Hitachi city, about  $\frac{1}{2}$  mile S of Sukegawa railway station and within 300 yards of the coast.

1. XXI Mission 197, 10 June 1945, HE attack with 2000# bombs. This mission resulted in the virtual destruction of the plant. Total damage is approximately 2,143,000 sq.ft. or nearly 97% of the total roof area. 80.5% of the total roof area was destroyed or damaged structurally.

624  
232  
856

589  
231  
820

624  
191  
815



90.14-1476 HITACHI Engineering Works, KAIGAN Plant - Located SW of SUKEGAWA  
 $\frac{1}{4}$  mi. from shore.  $36^{\circ}35'$  N -  $140^{\circ}39'$  E

Important producer of heavy electrical equipment. Also produces diesel engines. Reported partially converted to production of tanks, and aircraft components.



JOINT TARGET GROUP, WASHINGTON, D. C.  
**TARGET LOCATION SHEET**

**HITACHI ENGINEERING WORKS, KAIGAN PLANT**  
**SUKEGAWA** **JAPAN**

**CONFIDENTIAL**  
 SHEET ..... 90:14-1476-TL  
 DATE ..... 5 June 1945  
 TARGET ..... 90:14-1476  
 CATEGORY ..... Bsc. Eqpt. Ind.-  
                                   MACHY. & MACH. TOOLS  
 COORDINATES ..... 36°35'N 140°39'E  
 ALTITUDE ..... 65 feet

**SIGNIFICANCE:**

One of largest heavy electrical equipment plants in Japan. Produces medium and large motors, generators, turbines, transformers, elevators, hoists, conveyors, switchboards and electric locomotive parts. Pre-war production estimated at 30% of Japanese heavy generator output and 40% of all power plant machinery.



**LARGE SCALE ILLUSTRATION—SCALE APPROX.: 1:9,750**

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.



**SMALL SCALE ILLUSTRATION—SCALE APPROX.: 1:65,000**

**CONFIDENTIAL**

File No. **512,476.1**



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C. I. U.  
XXI BOMBER COMMAND  
APO 234, c/o POSTMASTER  
SAN FRANCISCO, CALIFORNIA

(Combined PI Sections: 3rd Photo Recon Squadron and 35th Photo Tech Unit)

14 June 1945

STRIKE ATTACK REPORT NO. 105

90.14-1476

HITACHI ENGINEERING WORKS, KAIGAN PLANT

XXI Bomber Command Mission 197

Bombing Accuracy: Excellent

True Heading over Target: 33-64°

Aircraft over Target: 120

Time of Attack: 092357Z-100030Z

Bursts on Target: 553

Bomb Load: 628 x 2000 AN-M66,  
.025 nose and tail;  
231 x 2000 AN-M66,  
.1 nose, .025 tail.

NARRATIVE

Good quality strike photos from all squadrons show excellent bombing results. Approximately 85 percent of the target is destroyed. Reinforced concrete buildings at the center of the E edge of the target received at least 10 direct hits. Internal damage is impossible to assess but is believed to be severe.

All other major buildings are gutted or destroyed. Smoke from several fires in the target area limits assessment of damage. Direct hits are visible on the railroad E of the plant. Numerous small houses are destroyed about 550' E of the target.

BOMBING ACCURACY STATISTICS

- \*a. TOTAL BOMBS PLOTTED:  
589 x 2000 AN-M66: .025 nose and tail.  
231 x 2000 AN-M66: .1 nose, .025 tail.
- \*b. 629 visible bursts plotted.
- \*c. 191 calculated probable bursts plotted.
- d. 559 bursts within 1000' of AP; 73.7 percent.  
205 " " 2000' of AP; 25.0 "  
11 " " 3000' of AP; 1.3 "
- e. 10 bombs or 1 percent of bursts more than 3000' from AP.
- f. Target of opportunity: Hachijo Jima, 7 AN-M66.
- g. Unknown: 7 AN-M66.
- h. Jettisoned: 25 AN-M66; .025 nose and tail,  
7 AN-M66, .1 nose, .025 tail.

\*NOTE: No information received as to discrepancy between total in (a) and the total of (b) and (c).

CONFIDENTIAL



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Strike Attack Report No. 105, cont'd.

Photos received:

XXI BC 5M 197--1V5-7; 1V16, 18, 20, 22	XXI BC 5M 197--15V2; 3, 10, 12
" " " " 2V2, 3; 8-11	" " " " 16V2; 6-8
" " " " 3V15, 16	" " " " 17V2; 6; 8; 15
" " " " 4V2; 3; 9, 10	" " " " 18V2; 6; 8; 10, 20
" " " " 5V2; 10, 11	" " " " 19V8; 11
" " " " 6V2, 3, 6	" " " " 20V2, 3, 6, 8
" " " " 7V8-10	" " " " 22V10; 13; 14
" " " " 8V10, 11, 14	" " " " 23V80, 82
" " " " 9V2, 3, 5-7	" " " " 24V77-79
" " " " 10V10, 11, 17, 19	" " " " 26V2, 5; 6, 13
" " " " 11V3; 7; 8	" " " " 27V2, 3, 4
" " " " 12V2; 6; 7	" " " " 28V73
" " " " 13V2, 6, 7	" " " " 29V6; 7, 11, 13
" " " " 14V11, 14, 15	" " " " 31V1, 9-11

Annotated and attached: one bomb fall plot.

This report received from 73rd Bombardment Wing, XXI Bomber Command and approved and reproduced by CIU, XXI Bomber Command.

Approved *Robert K. Bass* Capt. AC  
for HAMILTON D. DAREY  
MAJOR, AC

DISTRIBUTION: "C"

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TARGET 90.14-1476  
XXI BOM. COM. MISSION 197  
10 JUNE 1945  
STRIKE ATTACK REPORT 105  
C.I.U.-XXI BOM. COM.  
CONFIDENTIAL

BOMB PLOT  
HITACHI ENGINEERING WORKS  
1-2-75  
10 JUNE 1945

● VISIBLE HITS  
○ PROBABLE HITS





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C. I. U.  
XXI BOMBER COMMAND  
APO 234, c/o POSTMASTER  
SAN FRANCISCO, CALIFORNIA

(Combined PI Sections: 3rd Photo Recon Squadron and 35th Photo Tech Unit)

14 June 1945

STRIKE ATTACK REPORT NO. 105

90.14-1476  
HITACHI ENGINEERING WORKS, KAIGAN PLANT

XXI Bomber Command Mission 197	Bombing Accuracy: Excellent
True Heading over Target: 33-64°	Aircraft over Target: 120
Time of Attack: 092357Z-100030Z	Bursts on Target: 553
	Bomb Load: 620 x 2000 AN-M66, .025 nose and tail; 230 x 2000 AN-M66, .1 nose, .025 tail.

NARRATIVE

Good quality strike photos from all squadrons show excellent bombing results. Approximately 85 percent of the target is destroyed. Reinforced concrete buildings at the center of the E edge of the target received at least 10 direct hits. Internal damage is impossible to assess but is believed to be severe.

All other major buildings are gutted or destroyed. Smoke from several fires in the target area limits assessment of damage. Direct hits are visible on the railroad E of the plant. Numerous small houses are destroyed about 550' E of the target.

BOMBING ACCURACY STATISTICS

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11 " " 3000' of AP; 1.3 "
- e. 10 bombs or 1 percent of bursts more than 3000' from AP.
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- g. Unknown: 7 AN-M66.
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7 AN-M66, .1 nose, .025 tail.

\*NOTE: No information received as to discrepancy between total in (a) and the total of (b) and (c).

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Strike Attack Report No. 105, cont'd.

Photos received:

XXI BC 5M 197--1V5-7; 1V16, 18, 20, 22	XXI BC 5M 197--15V2; 3, 10, 12
" " " " 2V2, 3; 8-11	" " " " 16V2; 6-8
" " " " 3V15, 16	" " " " 17V2; 6; 8; 15
" " " " 4V2; 3, 9, 10	" " " " 18V2; 6, 8; 10, 20
" " " " 5V2; 10, 11	" " " " 19V8; 11
" " " " 6V2, 3, 6	" " " " 20V2, 3, 6, 8
" " " " 7V8-10	" " " " 22V10; 13, 14
" " " " 8V10, 11, 14	" " " " 23V80, 82
" " " " 9V2, 3, 5-7	" " " " 24V77-79
" " " " 10V10, 11, 17, 19	" " " " 26V2, 5; 6, 13
" " " " 11V3; 7; 8	" " " " 27V2, 3, 4
" " " " 12V2; 6; 7	" " " " 28V73
" " " " 13V2, 6, 7	" " " " 29V6; 7, 11, 13
" " " " 14V11, 14, 15	" " " " 31V1, 9-11

Annotated and attached: one bomb fall plot.

This report received from 73rd Bombardment Wing, XXI Bomber Command and approved and reproduced by CIU, XXI Bomber Command

Approved *Robert K. Bass* Capt. AC  
for HAMILTON D. DAREY  
MAJOR, AC

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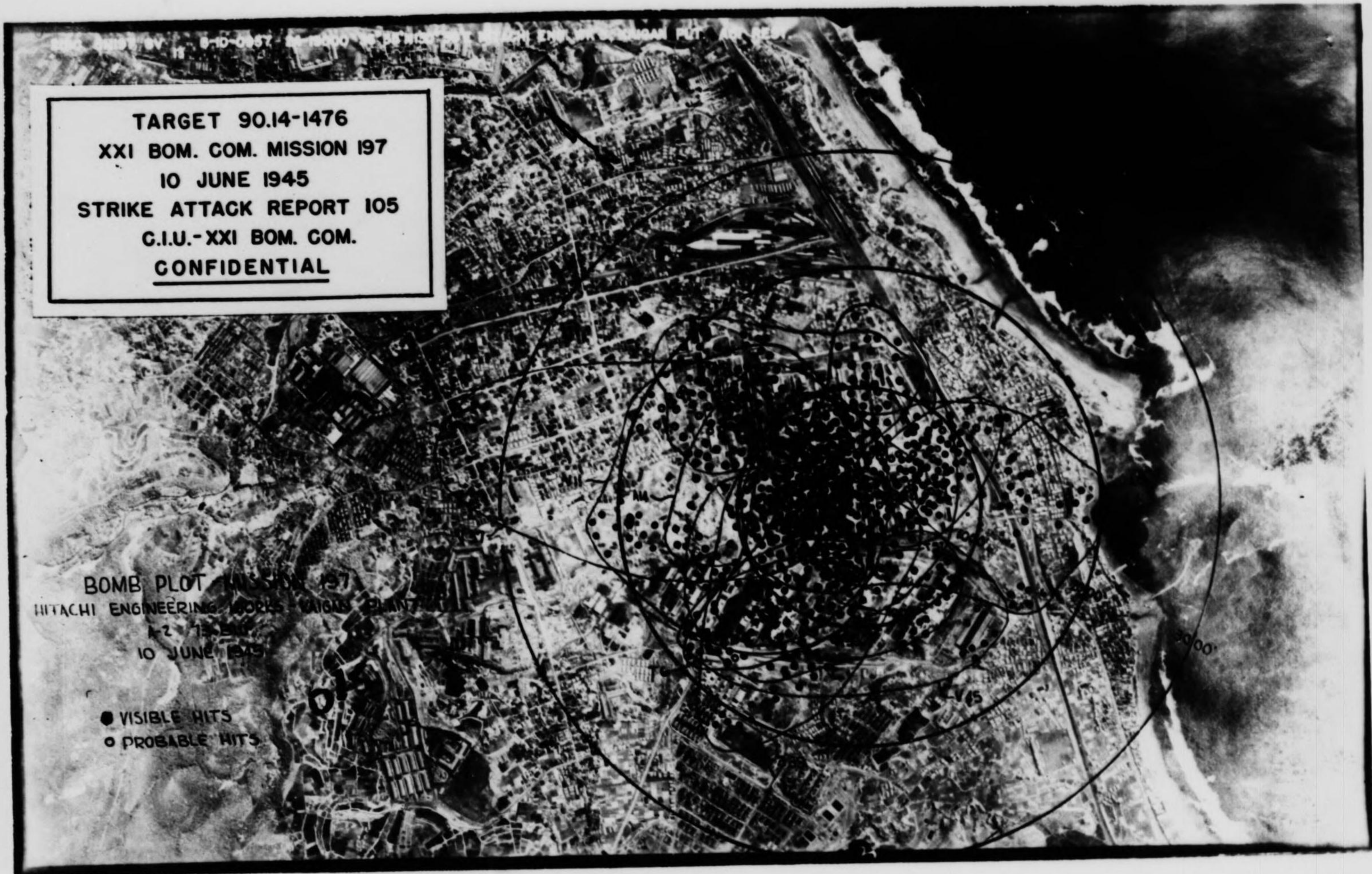
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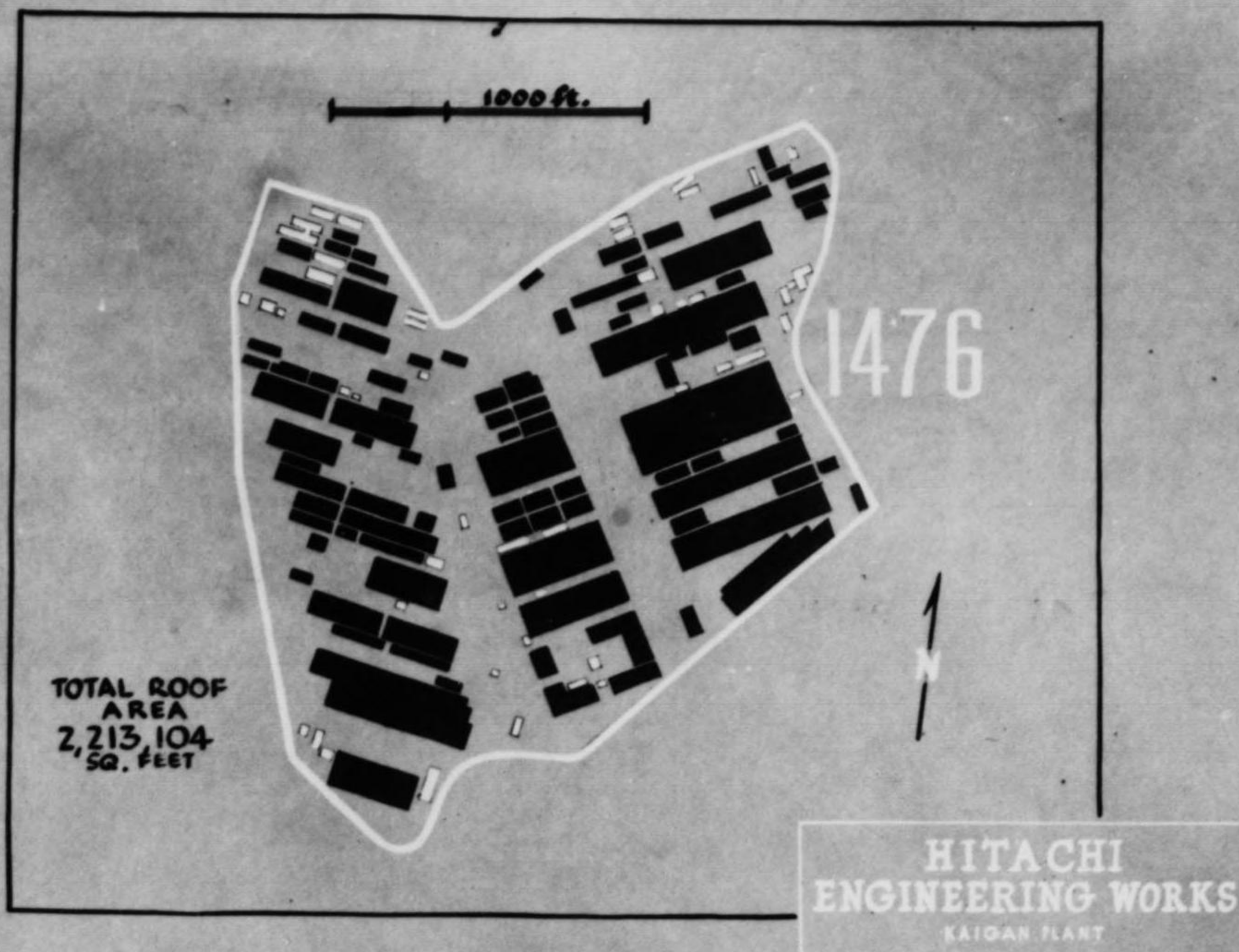
TARGET 90.14-1476  
XXI BOM. COM. MISSION 197  
10 JUNE 1945  
STRIKE ATTACK REPORT 105  
C.I.U.-XXI BOM. COM.  
CONFIDENTIAL

BOMB PLOT  
HITACHI ENGINEERING WORKS  
10 JUNE 1945

● VISIBLE HITS  
○ PROBABLE HITS







MISSION NO				
DAMAGE	97.5%			
WINGS	73			
DATE	10 JUNE '45			
DAY/NIGHT	DAY			
BOMB TYPE	G.P.			
AV. LOAD	14,352			
A/C AIRBORNE	124			
A/C BOMB. P.T.	118			
TONS ON P.T.	806			
ALTITUDE	19,600-21,200			
BOMB. METH.	V			
CLAIMS	UNKNOWN			
LOSSES	0			

M66-2000 II  
 1/40 Delay Tail  
 Variable Nose



CONFIDENTIAL

NOT TO BE TAKEN  
INTO THE AIR ON  
COMBAT MISSIONS

TARGET: 90.14-1476

OBJECTIVE AREA: 90.14-MITO

---

T A R G E T I N F O R M A T I O N S H E E T

---

TARGET 90.14-1476

HITACHI ENGINEERING WORKS, KAIGAN PLANT

Latitude: 36° 35' N  
Longitude: 140° 39' E  
Elevation: Less than 100 ft.

1. LOCATION AND IDENTIFICATION: The target is located to the south of Hitachi City about one-half mile southwest of Sukegawa railway station and within 300 yards of the coast. The Mito/Onahama railway runs parallel with the eastern boundary of the plant site and two spurs run from the main line into the plant area. The plant is also served by a spur from the electric railway running to the two Hitachi plants to the north.
2. TARGET DESCRIPTION: The plant covers an irregular shaped area measuring roughly about 2500 ft. north-south and 3000 ft. east-west. Total roof area is 2,213,104 sq. ft., total number of buildings comprising the plant - 143.

The plant has been greatly extended during the past few years. It is divided into three distinct areas, the westerly of which has been constructed since the outbreak of war. A fourth area to the north of the new area is believed to be part of the plant, but there is no direct confirmation of this.

Very little ground information is available regarding the work carried on in the various buildings. The many large buildings, the stockyards, gantry cranes and the internal rail tracks serving many of the buildings confirm to a great extent the reports that the plant produces heavy electrical and other machinery.

3. IMPORTANCE: The Kaigan plant of the Hitachi Engineering Co. is the largest of the three Hitachi plants in the vicinity and is reported to produce all types of heavy electrical machinery; marine turbines, elevators, conveyors, electric locomotives, diesel engines, and boilers. Ground reports indicate that the pre-war production of generators and power plant machinery represented 31% and 40% respectively of Japan's total output of this class of machinery.

Reports that the plant has been partially converted to the production of tanks and aircraft components have not been confirmed.

9 September 1945.

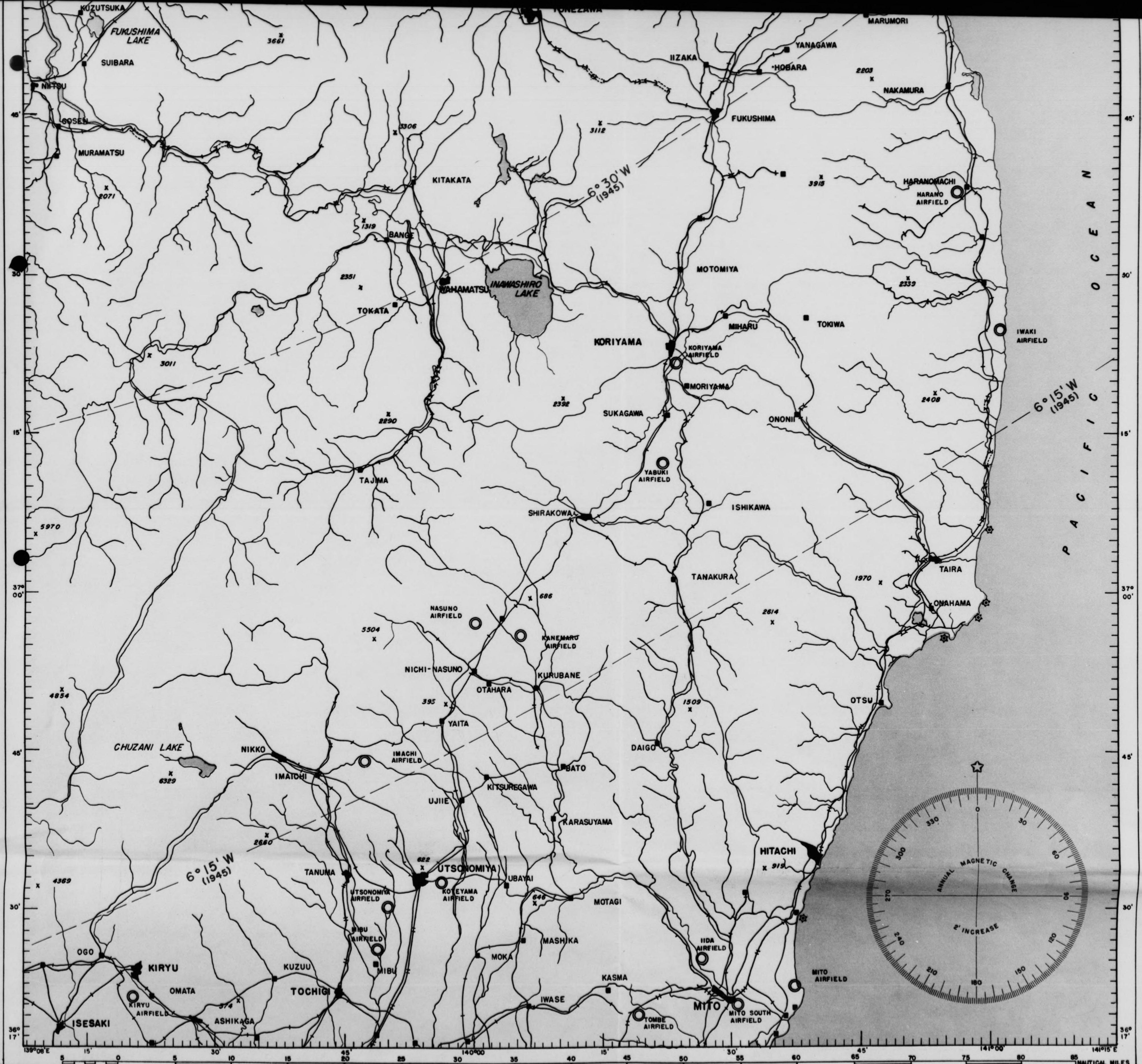
TARGET SECTION, A-2  
TWENTIETH AIR FORCE



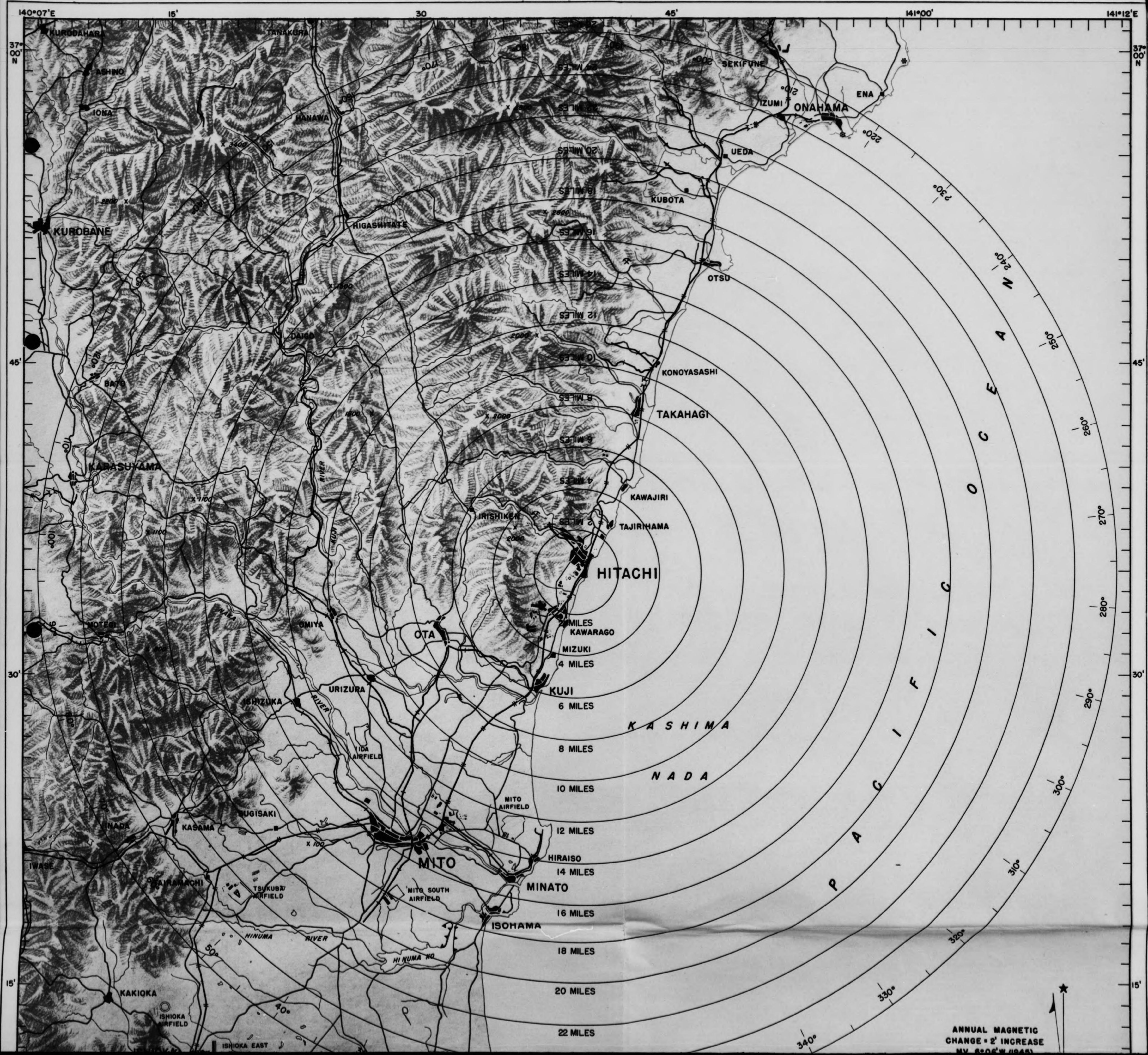
APRIL 1945



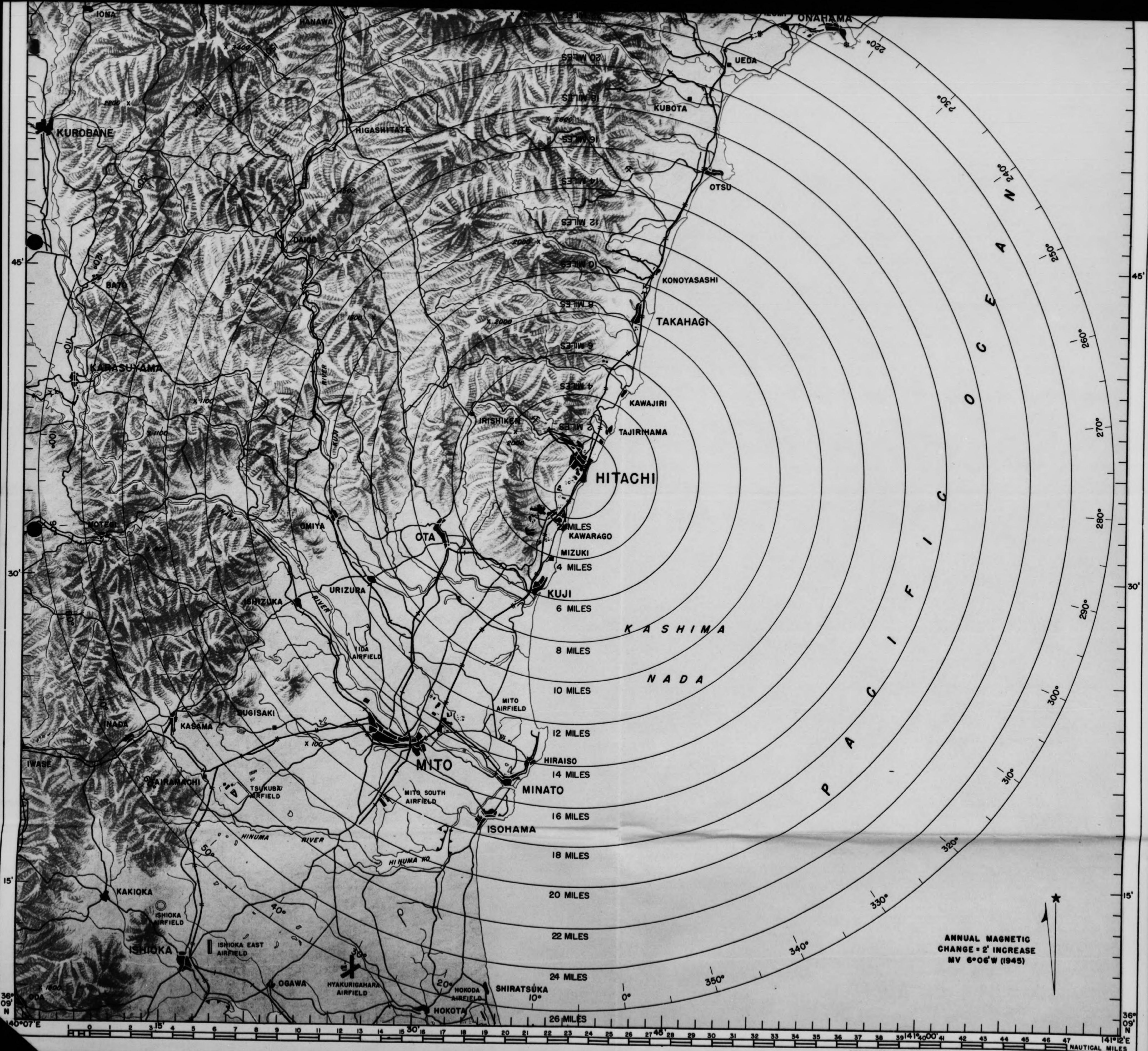






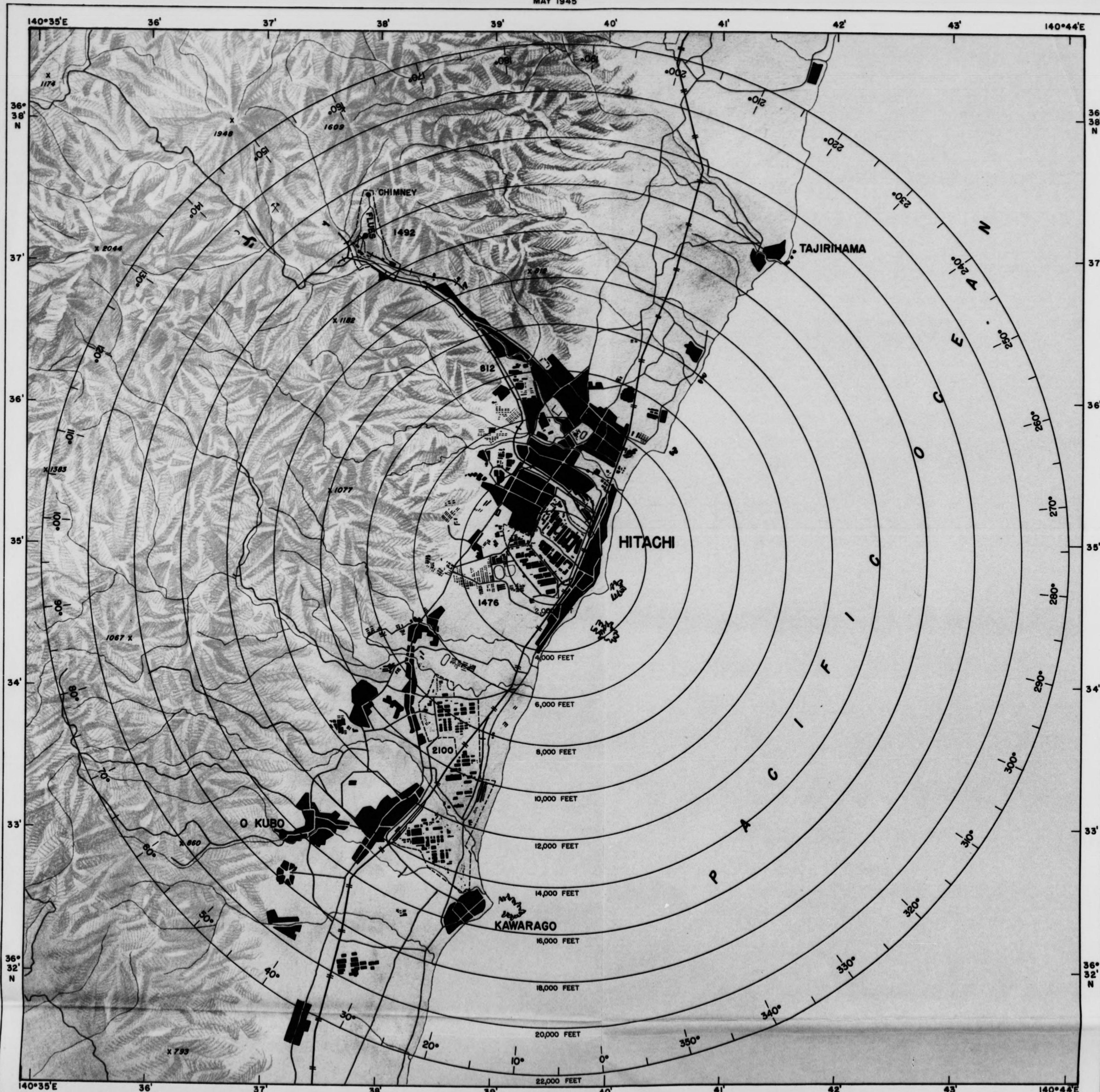






ANNUAL MAGNETIC  
CHANGE = 2' INCREASE  
MV 6°06'W (1945)





NO.	DESIGNATION	ELEV.
812	HITACHI COPPER REFINERY	25'
1476	HITACHI ENGINEERING WORKS KAIGAN PLANT	13'
1492	HITACHI COPPER SMELTER	65'
2100	UNIDENTIFIED INDUSTRY	10'

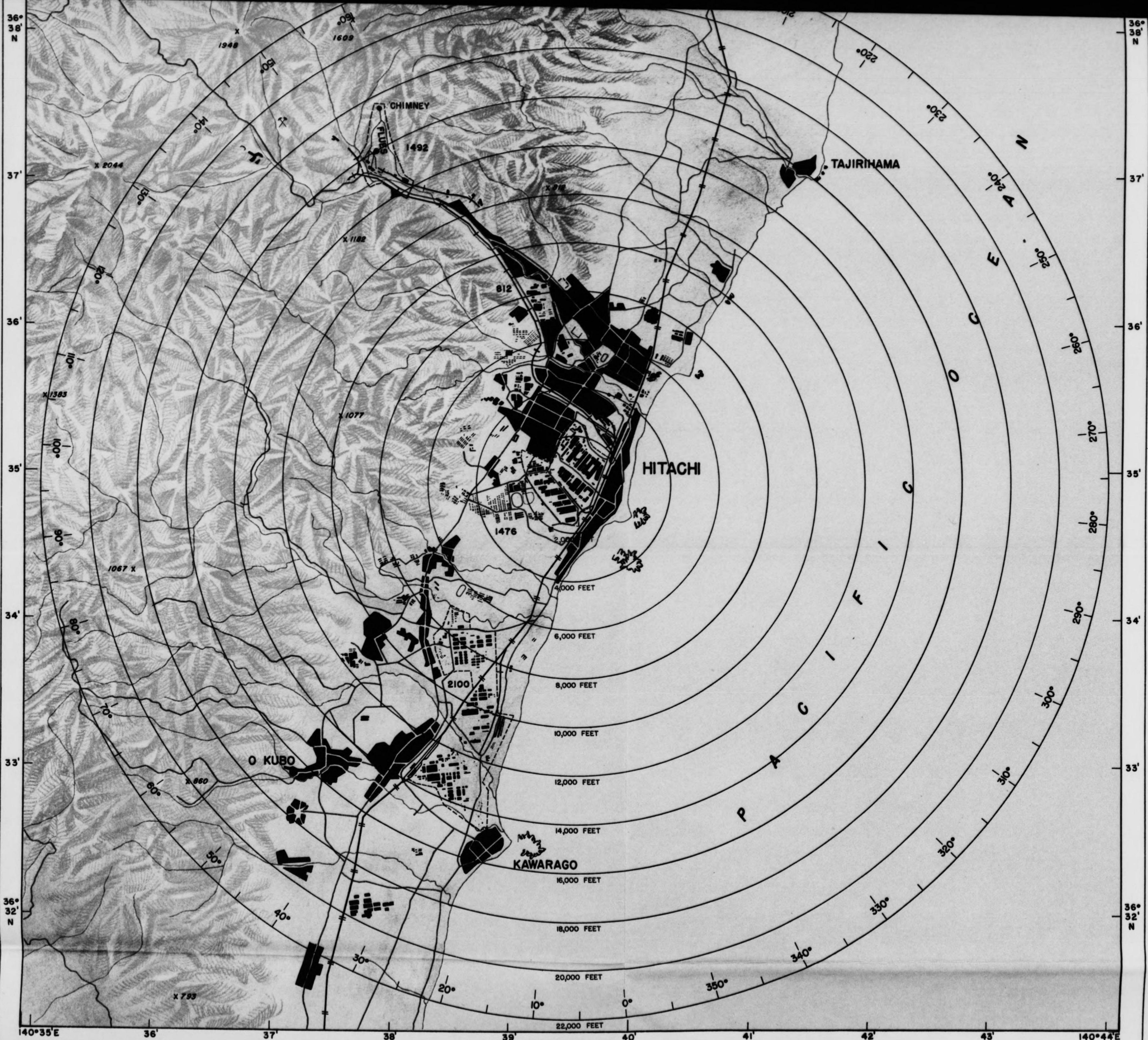
WW CORAL REEF



COMPASS ROSE INDICATES  
MAGNETIC BEARING TOWARD  
THE TARGET

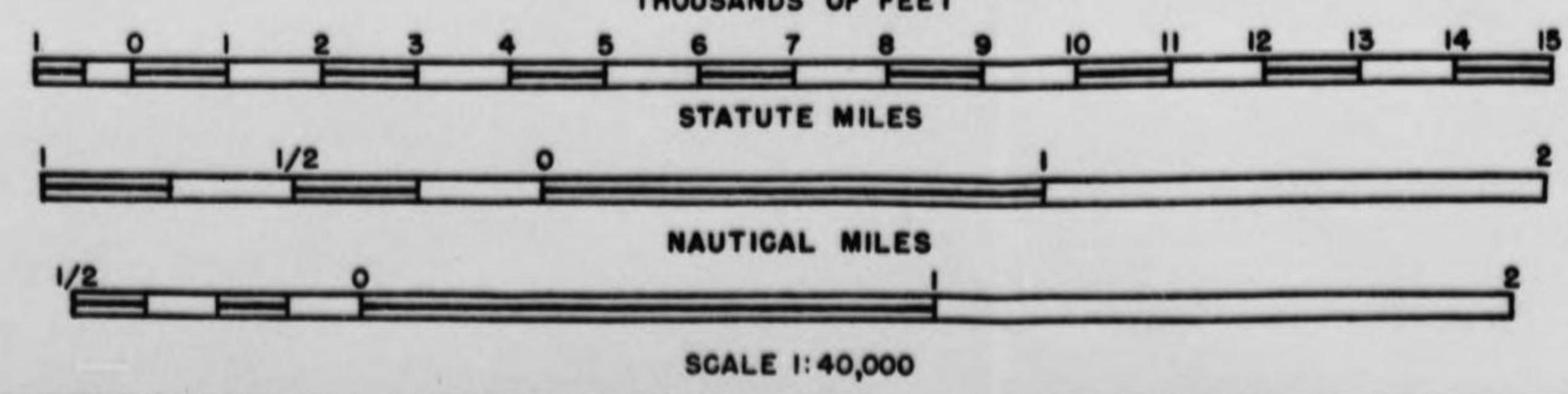
MAG DEC 6°02' W (1945)  
ANNUAL MAGNETIC  
CHANGE = 2' INCREASE





NO.	DESIGNATION	ELEV.
812	HITACHI COPPER REFINERY	25'
1476	HITACHI ENGINEERING WORKS KAIGAN PLANT	13'
1492	HITACHI COPPER SMELTER	65'
2100	UNIDENTIFIED INDUSTRY	10'

WW CORAL REEF



COMPASS ROSE INDICATES  
MAGNETIC BEARING TOWARD  
THE TARGET

MAG DEC 6°02' W (1945)  
ANNUAL MAGNETIC  
CHANGE 2' INCREASE

COMPILED FROM 3D PHOTO RCN SQ PHOTOS, APRIL 1945

COMPILED AND REPRODUCED BY 949TH ENGR AVN TOPO CO



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MAG DEC  
6° 06' W  
ANNUAL  
CHANGE  
2' INC



**HITACHI AREA (SUKEGAWA)**  
**HITACHI ENGINEERING WORKS-KAIGAN PLANT**  
TARGET NO. 90.14-1476  
36° 35' N-140° 39' E  
APRIL 1945

A-2 SECTION  
XXI BOMBER COMMAND  
3D PHOTO RCN SQ PHOTOS  
6 APRIL 1945  
PREPARED BY 949TH ENGR AVN TOPO CO

APPROX SCALE  
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MAG DEC  
6° 06' W  
ANNUAL  
CHANGE  
2' INC



**HITACHI AREA (SUKEGAWA)**  
**HITACHI ENGINEERING WORKS-KAIGAN PLANT**  
TARGET NO. 90.14-1476  
36° 35' N-140° 39' E  
APRIL 1945

A-2 SECTION  
XXI BOMBER COMMAND  
3D PHOTO RCN SQ PHOTOS  
6 APRIL 1945  
PREPARED BY 949TH ENGR AVN TOPO CO

APPROX SCALE  
2000 0 2000 4000 6000 8000 FEET

2100

1476

812

72

47

43







RESTRICTED





47

XXIBC

RESTRICTED



AP EN 10 51



PR5M118-31:48-XX13C-4:6:1409K-40": 32,500-3632N14035E/3636N14003

*Restricted*





PRSM 118-2

32

3047

RESTRICTED





SPR 54118

RESTRICTED





SW 2 34

20 AF

RESTRICTED





3PR5M355-4R

2875





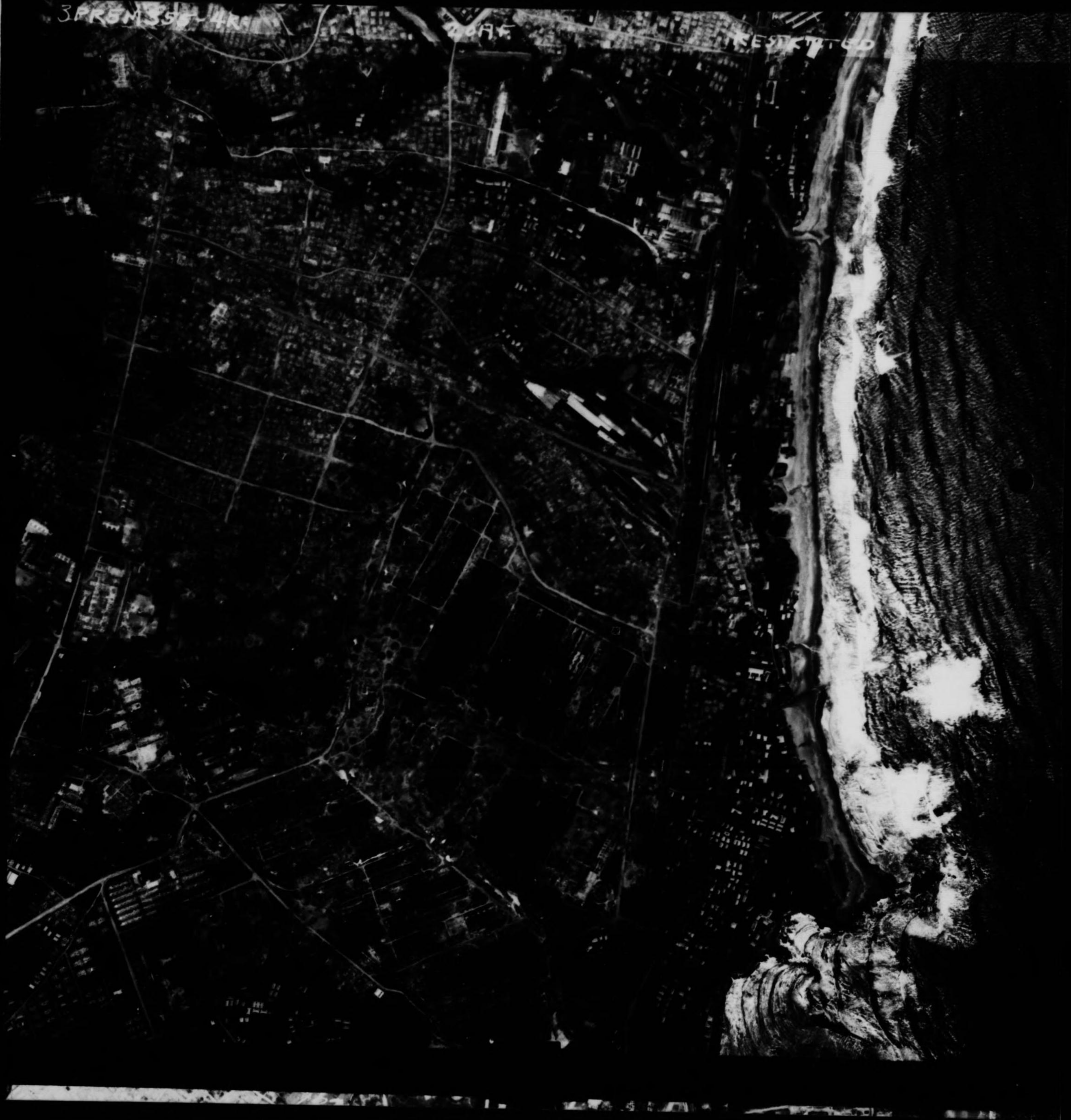




3 PROM 355-4R

WAF

WEST T. 6D





REF 555-4K

RESTRICTED





3PK 5M 355 - 2

2077

101





3PK 5M 355 - 2

102





3PR 5M 355-2

2047

103





CONFIDENTIAL

C. I. U.  
XXI BOMBER COMMAND  
APO 234, c/o POSTMASTER  
SAN FRANCISCO, CALIFORNIA

11 July 1945

DAMAGE ASSESSMENT REPORT 127

90.14-1476  
HITACHI ENGINEERING CO., KAIGAN PLANT  
36/35N - 140/39E

Mission No.: 3FR5M323 Target Area: Mito (90.14)  
Date Flown: 6 July 1945 Altitude: 29,000'

SUMMARY

This report assesses damage to the above target resulting from XXI Bom Com Mission 197, 10 June 1945.

Post-strike photos show Target 1476 to be virtually destroyed. Total damage is about 2,142,900 sq.ft., which represents approximately 96.8% of the total roof area.

Of a total of 143 buildings comprising the original plant, only about 10 show no visible damage. These are small buildings having a total roof area of less than 50,000 sq. ft.

About 1,781,040 sq.ft., or 80.5% of the total roof area was destroyed or suffered structural damage. All major buildings are completely damaged, most of them being either destroyed or structurally damaged.

Three stock storage yards (20, 52 and 110 on the attached annotated print) show signs of having been heavily damaged. Railway facilities within the plant area were completely demolished.

STATISTICAL SUMMARY OF DAMAGE

Damage from current strike:

	Square feet of roof	Percent of original roof area
Destroyed or Structural damage	1,781,040	80.5
Superficial:		
1. Guttled	361,860	16.3
2. Minor roof damage	-----	-----
Total damage	2,142,900	96.8

Total roof area of plant: 2,213,104 sq. ft.

ITEMIZATION OF DAMAGE FROM CURRENT STRIKE

Number (Ref. A)	DAMAGE IN SQUARE FEET				Percent of roof	Function of building. comment (Ref. A)
	Roof area	Destroyed or Structural	Guttled	Total		
7	4,173	4,173		4,173	100	Storage
8	7,346	7,346		7,346	100	Poss. Pattern Store
12	39,150	39,150		39,150	100	Poss. light metal casting foundry
13	18,020	18,020		18,020	100	Workshop

CONFIDENTIAL



CONFIDENTIAL

D/... Report 127, cont'd.

DAMAGE IN SQUARE FEET

Number (Ref.A)	Roof area	Destroyed or Structural	Gutted	Total	Percent of roof	Function of building comment (Ref.A)
14	2,500	2,500		2,500	100	Storage
15	3,264		3,264	3,264	100	"
16	9,275	9,275		9,275	100	"
17	12,412	12,412		12,412	100	"
18	1,682	1,682		1,682	100	"
19	9,275	9,275		9,275	100	Covered Stock Yard
21	4,205	4,205		4,205	100	Storage
22	2,782	2,782		2,782	100	"
23 & 24	8,745	8,745		8,745	100	"
25	7,685	7,685		7,685	100	"
26	7,155	7,155		7,155	100	"
27	42,586	42,586		42,586	100	Machine shop
28	37,450	37,450		37,450	100	" "
29	3,042	3,042		3,042	100	Storage
30	3,393	3,393		3,393	100	"
31	37,450	37,340		34,450	100	Assembly
32	6,825	6,825		6,825	100	Storage
33	26,520	26,520		26,520	100	Machine Shop
34	19,176	19,176		19,176	100	" "
35	4,624	4,624		4,624	100	Prob. test shop
36	30,940	30,940		30,940	100	Machine shop
37	13,872	13,872		13,872	100	" "
38	7,112	7,112		7,112	100	" "
39	3,393	3,393		3,393	100	" "
40	15,873	15,873		15,873	100	" "
41	3,393	3,393		3,393	100	Storage
42	47,600		47,600	47,600	100	Assembly
43	4,624		4,624	4,624	100	Prob. test shop
45	36,380	36,380		36,380	100	Machine shop
46	36,380	12,720	23,660	36,380	100	" "
47	5,850	5,850		5,850	100	Storage
48	3,588	3,588		3,588	100	"
49	12,480	12,480		12,480	100	"
50	2,262	2,262		2,262	100	"
51	192,290	192,290		192,290	100	Heavy casting foundry
56	62,000	8,342	26,250	34,592	56	Prob. foundry
59	13,862	2,770		2,770	20	Prob. adm. offices
61	14,960	2,990		2,990	20	Prob. offices
62	27,220	12,249		12,249	45	Prob. drawing & tech- nical offices
64	76,500	76,500		76,500	100	Heavy casting foundry
65	104,040	104,040		104,040	100	Machine shop & forge
66	3,364	3,364		3,364	100	Storage
67	4,350	4,350		4,350	100	"
68	9,180	9,180		9,180	100	Unidentified
70	7,888	7,888		7,888	100	"
71	7,888	7,888		7,888	100	"
72	2,958	2,958		2,958	100	"
73	9,180	9,180		9,180	100	"
74	83,640		83,640	83,640	100	Assembly
75	6,728	6,728		6,728	100	Unidentified
76	4,624	4,624		4,624	100	"
77	3,432	3,432		3,432	100	"
78	9,248	9,248		9,248	100	"
79	7,752	7,752		7,752	100	"
80	2,695	2,695		2,695	100	"
81	2,695	2,695		2,695	100	"
82	9,248	9,248		9,248	100	"
83	12,222	12,222		12,222	100	"
84	2,262	2,262		2,262	100	"
85	3,638	3,638		3,638	100	Storage
86	3,298	3,298		3,298	100	"

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127, cont'd

Number Ref.A)	Roof area	Destroyed or Structural	Gutted	Total	Percent of roof	Function of building; comment; (Ref.A)
87	2,262	2,262		2,262	100	Storage
88	4,875	4,875		4,875	100	"
89	3,047	3,047		3,047	100	"
90	10,706	10,706		10,706	100	"
91	8,800	8,800		8,800	100	"
92	3,335	3,335		3,335	100	"
93	2,813	2,813		2,813	100	"
94	2,262	2,262		2,262	100	Transformer Maintenance shop
95	1,463	1,463		1,463	100	Switch house
97	13,520	13,520		13,520	100	Storage
98	9,696	9,696		9,696	100	"
99	3,638	3,638		3,638	100	Prob. switch house
100	3,783	3,783		3,783	100	Shop
101	1,131	1,131		1,131	100	Transformer house
102	7,200	7,200		7,200	100	Storage
103	2,813	2,813		2,813	100	Heat treatment shop
104	12,870	12,870		12,870	100	Unidentified
105	5,850	5,850		5,850	100	"
106	16,080	16,080		16,080	100	Storage
107	5,136	5,136		5,136	100	"
108	4,914	4,914		4,914	100	"
109	71,400	71,400		71,400	100	Reported small transform- er assembly shop
111	4,176	4,176		4,176	100	Unidentified
112	2,813	2,813		2,813	100	Storage
113	4,914	4,914		4,914	100	"
114	1,972	1,972		1,972	100	"
115	2,784	2,784		2,784	100	Boiler house
116	3,264	3,264		3,264	100	" "
117	6,857	6,857		6,857	100	Prob. Diesel eng.house
118	142,725	142,725		142,725	100	Reported large trans- former assembly shop
119	1,292	1,292		1,292	100	Pump house & water fil- ters
120	16,500	16,500		16,500	100	Storage
121	5,365	5,365		5,365	100	"
123	7,308	7,308		7,308	100	Shop
126	2,652	2,652		2,652	100	Unidentified
127	2,304	2,304		2,304	100	"
130	1,872	1,872		1,872	100	"
131	229,500	114,250	114,750	229,500	100	Reported turbine shop
132	2,850	2,850		2,850	100	Storage
133	5,850	5,850		5,850	100	"
134	4,914	4,914		4,914	100	"
135	2,973	2,973		2,973	100	"
136	96,768	96,768		96,768	100	Prob. motor & switch gear assembly
137	8,215	8,215		8,215	100	Pattern shop
138	10,282	10,282		10,282	100	" "
139	3,604	3,604		3,604	100	Boiler house
140	96,768	38,714	58,072	96,768	100	Large casting foundry
141	3,219	3,219		3,219	100	Storage
142	104,040	104,040		104,040	100	Prob. material stores
143	5,304	5,304		5,304	100	Storage
TOTAL:		1,781,040	361,860	2,142,900		

Reference A: AC/AS Functional Analysis Report No. F/A-146 4 June 1945

Photos: Pre-strike: 3PR5M118-3L: 46, 47  
Post-strike: 3PR5M323-3: 12, 13; 4L: 149, 150

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D/A Report 127, Cont'd.

- Inclosures: 1. 3PR5M118-3L: 47 annotated to show damage  
2. 3PR5M323-3: 13 (Post-strike)

Approved.....*E. W. Willet* 1st Lt. AC  
for HAMILTON D. DARBY,  
MAJOR, AC

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3.PR 5M 523-3:13



POST STRIKE

TARGET 90.14-1476

HITACHI ENGINEERING CO., KAIGAN PLANT

DAMAGE ASSESSMENT REPORT 127

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TARGET 90.14-1476  
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KAIGAN PLANT  
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500 0 500  
APPROX. SCALE IN FEET

LEGEND

- - DESTROYED OR STRUCTURAL DAMAGE
- ▣ - GUTTED

2340 C 35PTU 13 JUL 45