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From: Chief, Naval Technical Mission to Japan.
To : Chief of Naval Operations.
Subject: Target Report - Japanese Ordnance Equipment - Internal
Recorders, Wave and Tide Meters, Torpedo Recovery Gear,
Underwater Locators.
Reference: (a) "Intelligence Targets Japan" (DNI) of 4 September
1945.

1. Subject report, covering Target O-42 of Fascicle O-1
of reference (a), is submitted herewith.
2. The investigation of the target and the target report
were accomplished by Mr. E.H. Winger.


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O-42

JAPANESE ORDNANCE EQUIPMENT
INTERNAL RECORDERS, WAVE AND TIDE METERS
TORPEDO RECOVERY GEAR, UNDERWATER LOCATORS

"INTELLIGENCE TARGETS JAPAN" (DNI) OF 4 SEPT. 1945

FASCICLE O-1, TARGET O-42

JANUARY 1946

U.S. NAVAL TECHNICAL MISSION TO JAPAN

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE EQUIPMENT INTERNAL RECORDERS, WAVE AND TIDE METERS, TORPEDO RECOVERY GEAR, UNDERWATER LOCATORS

The Japanese had no practical or adequate equipment for making wave observations. Attempts were being made to apply methods of serial photography in obtaining wave contours, but this project was terminated at the end of the war without gaining information concerning its success. Tide and current meters in use were either importations from England and the United States or direct copies of such equipment. Japanese instrumentation has been such that internal recorders were rarely used, one exception being a torpedo depth, roll, and speed recorder of standard design. No special torpedo recovery gear was noted; Japanese methods were conventional. Considerable research had been devoted to underwater locators and several types had been developed. This subject is not discussed in this report. The only information gained in this investigation is that the Japanese were using standard equipment and had developed no new or improved apparatus.

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REFERENCES

- A. Japanese Personnel Who Assisted in Gathering Documents:
Terutoshi NAKAMIYA, Japanese Hydrographic Office.
- B. Japanese Personnel Interviewed:
1. Terutoshi NAKAMIYA, Japanese Hydrographic Office.
 2. Kohei ONO, Japanese Hydrographic Office.
 3. Captain HAYASHI, Naval Technical Research Institute, TOKYO.
 4. Lt.Cmdr. Ikumasa FUKUDA, Experimental Department of Torpedoes, Kure Naval Yard.
 5. Goro TOMINAGA, Japanese Hydrographic Office.
 6. Atsushi KAZAMA, Japanese Hydrographic Office.
 7. Lt. YOSHIDA, First Naval Arsenal, YOKOSUKA.
 8. Tech.Maj. H. NAKAMURA, Seventh Military Technical Laboratory.
- C. Japanese Document Forwarded Through ATIS to Washington Document Center:
"Operating instructions for stereoplanograph" -
NavTechJap Document No. ND50-3803, ATIS No. 3888.

INTRODUCTION

This investigation was conducted to gain information concerning Japanese equipment such as internal recorders, wave and tide meters, torpedo recovery gear, and underwater locators. Personnel from technical institutions in Japan were interrogated, and tours of inspection to some of these establishments were conducted. All pertinent Japanese documents which were discovered were appropriated. A survey of Japanese instrumentation for various types of ordnance such as mines, bombs, torpedoes, etc. was undertaken to determine the use of such equipment as concerned this investigation.

Close liaison was maintained with investigators of other ordnance subjects as they related to this study. The subject matter of this investigation is such that duplication of the work of other investigators was inevitable. For example, torpedo depth, roll, and speed indicators fall within the scope of this report under internal recorders, but a discussion of such a mechanism is an integral part of a report concerning only torpedoes. Similarly, a separate investigation was underway involving underwater locators. To prevent the writing of duplicate reports, all information obtained by this author on such topics was made available to the appropriate investigator. References to the reports are contained herein.

This investigation revealed that all the equipment studied, with the exception of underwater locators, had been neglected in the Japanese research program. The information gained in this investigation is of no value except as an indication of the equipment the Japanese were using.

THE REPORT

1. Wave Meters

Prior to 1939 Japanese observations on wave motion had been made visually, although attempts had been made to use Froude's wave meter and sensitive barometers. These methods failed to give accurate data on the wave elements such as length, amplitude, period, and velocity. It was decided to adapt methods of aerial photography to wave measurement, and in 1939 the Japanese Hydrographic Office purchased a stereoplanograph (Type C/5) from the Carl Zeiss Company, Germany. This apparatus was to be used in conjunction with two stereoscopic cameras having automatic shutters. It was thought that by controlling the time intervals between pictures and by determining wave contours from the pictures through the use of the stereoplanograph, accurate information on wave motion could be obtained. Except for the lenses, which were purchased from the Carl Zeiss Company, the cameras were of Japanese construction. These cameras were completed just before the end of the war; consequently the apparatus has never been used in practice. Investigation failed to disclose any other practical or adequate equipment which could be used for studying waves. A complete description of the stereoplanograph is given in reference C.

2. Tide Meters

Every device used by the Japanese for measuring the changes in water level due to tides was either an imported meter or a direct copy of meters used in England and the United States. No discussion is deemed necessary.

3. Current Meters

Two types of current meters were in use by the Japanese: the Ekman - Mery type and the Mensing type. Both of these are used in the United States.

4. Tide-Predicting Equipment

One tide-predicting machine was found. It is in use at the Japanese Hydrographic Office and is evidently the only one used by the Japanese. This machine is constructed to sum up 15 simple harmonic motions, called the tidal constants, and thus describe the tide-predicting curves. It was constructed in 1923 by Kelvin Bothomley and Baird, Ltd., Glasgow.

5. Internal Recorders

A survey of the instrumentation used by the Japanese in ordnance development revealed that little use was made of equipment which might be called "internal recorders." However, in torpedo tests, use was made of a depth, roll, and speed recorder. This recorder is discussed in NavTechJap Report - "Japanese Torpedoes and Tubes" - Index No. O-01.

6. Torpedo Recovery Gear

Standard methods were used to recover torpedoes. In experimental runs, the exercise head was filled with water, giving the torpedo a negative buoyancy. At the end of the run, when kinetic pressure was no longer in effect, a hydrostatic pressure gauge released compressed air from a container; thus, blowing water out of the exercise head through an exhaust valve. This procedure gave the torpedo positive buoyancy, and ordinary recovery procedures could be used. In the event the above procedure failed and the torpedo sank, the torpedo was recovered by dragging the bottom with a wire rope towed by two small floats.

There is no evidence of special noise-makers, dye releasing equipment, or similar devices having been placed in the torpedo to provide for location. A discussion and diagram of the mechanism used to blow the water out of the exercise head of the torpedo is given in NavTechJap Report - "Japanese Torpedoes and Tubes" - Index No. O-01.

7. Underwater Locators

Information on all types of underwater locators is given in the following Nav-TechJap reports:

"Japanese Electronic Harbor Protection Equipment" - Index No. E-26.

"Japanese Sonar and Asdic" - Index No. E-10.

"Japanese Minesweeping Gear and Equipment" - Index No. S-28.