

U. S. NAVAL SECURITY GROUP ACTIVITY
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22/WED/jlp
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Ser C-039
18 FEB 1966

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From: Commanding Officer, U. S. Naval Security Group Activity,
Kamiseya, Japan
To: Master, USNS GENERAL JOHN POPE (T-AP-110)
Subj: Communications Security Improvement (U)

1. Monitoring of POPE's CW radio transmissions indicates existence of transmitter characteristics which are considered to be a weakness in maintaining security during classified movements.

a. Most MSTs ships have a transmitter tone characteristic which is distinguishable from those of combatant type ships. The POPE has an additional tone characteristic which is identified from other MSTs ships. When transmitting at speeds of approximately 18 wpm or faster, a distinctive echo effect occurs which does not appear to exist when transmitting at slower speeds.

b. Radio fingerprinting (RFP) analysis of POPE transmitter RFP oscillogram recordings indicates a need for transmitter maintenance.

(1) Each time the transmitter is keyed during the formation of code characters, the frequency trace (FM) reveals a positive frequency shift of approximately 800 cycles during the initial 5 to 10 milliseconds of transmission. The frequency then stabilizes with a 122 cps ripple.

(2) The power output amplitude (AM) trace generally indicates approximately 25 percent power loss each time the key is depressed. This power loss is regained approximately 60 milliseconds after each depression of the transmitter key. The AM also contains a 122 cps ripple which is slightly out of phase with the FM ripple.

(3) At the terminal end of each keying, a "relay break" intermittently occurs 9 milliseconds after the key has been raised. The relay break measures 3 milliseconds in length.

(4) A ripple frequency is the rate of cyclic output of a transmitter's main power and generally originates due to one or more of the following:

(a) Improper filtering of DC voltage output from the main power supply.

(b) Faulty heater/cathode insulation of transmitter vacuum tubes.

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS.
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(c) Transmitters designed with directly heated cathode tubes in the oscillator or the stages following the oscillator stage of the transmitter.

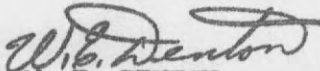
(5) Relay breaks are generally caused by dirty, pitted, arcing relays in the transmitter or may be due to bounce of the transmitter relays. The intermittent echo effect heard when the operator keys the POPE's transmitter rapidly is believed caused by relay break.

(6) An effect similar to relay break may be caused by use of a speed key which has contact bounce.

2. When a unit attempts to conceal its identity and/or movements through the use of indefinite or encrypted call signs, any existing transmitter characteristics jeopardize the security attempts made. Units which have distinctive tone characteristics alert monitoring stations, friendly and unfriendly, through the characteristics. Monitor emphasis can then be directed toward the particular unit with minimum effort.

3. Identifications made on POPE's transmitter during the transmission of encrypted or weather traffic, while using indefinite call signs, is reported monthly in the originators traffic analysis summary. COMSTSPAC is on distribution of the above summary.

4. RFP analysis was performed in accordance with article 548.c of NWP 16(B). This memorandum is forwarded in the interest of improving the security and naval communications.


W. E. DENTON
By direction

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