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Extract From

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COMMENTS AND RECOMMENDATIONS ON ARMY GROUND FORCE EQUIPMENT REVIEW BOARD PRELIMINARY BOARD STUDY

SECTION XVIII - COMMUNICATION EQUIPMENT

COMMENTS ON SPECIFIC PARAGRAPHS:

1. Par. 89b: Several ideas for speech security are suggested as follows:

a. Transmitter or microphone impulses would be recorded magnetical on steel wire. Magnetized wire actuates a relay to send pulses over the communication medium. (It is the output of this relay which could be changed hourly or daily to provide security." Procedure reversed at receiving end. As wire passes relay actuating point, it goes through a demagnetizer which prepared it for reuse. A slight delay in transmission might be experienced, but it would be almost unnoticeable.

(?)

b. Superimpose voice impulses on variable frequency howlers with filters at receiving end to remove howl.

N.G.

c. Record voice impulses on wire and send it at super high-speed to be restored at receiving end. Speeds to be variable for security. Securit must be either Secret or non-Secret with no in-between measures. Due to difficulty in training large wartime staffs, all personnel must be assured that noghting they say can be comprised or that everything they say can be comprised. (Eighth Army)

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2. Par 89b: At the present time the lack of security is the greatest drawback in the use of the all important multi-channel radio carrier systems between large headquarters. Concur in the importance of this item.) (Pacific Warfare Board)

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5. Par 89e: - - - - - -

k. Devise a small compact, portable, 2-way radio-telephone with scrambler for use between divisions, regiments, battalions and patrols in place of wire circuits.

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8. Par 89.h: A mechancial authentication device is needed. Settings for this device would be an item of SOI. This device should be as small as possible and might be contained in a case about the size of a pocket watch. (Eighth Army)

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ADDITIONAL COMMENTS:

d. d. Improvement on SIGGUM machine, teletype and SIGABA combined, so as to code and transmit in one operation through carrier over radio, is recommended. Equipment should be lighter and more compact.

f. Production of New Communication Equipment: (These remarks may also find application to other types of equipment). Securing a piece of satisfactory military communication equipment presupposes a logical chain from fundamental research to the quantity production of an item. This chain may be divided into four steps or phases which are as follows:

(1) Step No. 1 includes the work done by physicists or their equivalent and results in new basic information and basic components. An example would be the invention of an entirely new and different type of vaccum tube.

(2) Step No. 2 is the application of the basic information and components discovered in step No. 1. This step is usually accomplished by a high type of engineer with such vision as to be able to demonstrate a practical application to the theoretical work of the physicists in stage No. 1. Stage No. 2 will usually result in what might be named an engineering model which will demonstrate the practicability of a complete piece of equipment but which will in no way result in a piece of equipment satisfactory for manufacture an issue to troops.

(3) Stage No. 3 is the transition stage between the engineering model and the completion of a production model and a set of production drawings. This work is usually accomplished by a more practical type of individual than those working in the preceding two stages. Very frequently the work accomplished in phase 3 is referred to as "monkey wrench engineering".

(Personnel working on equipment in this stage should have a comprehensive knowledge of the capabilities and the limitations imposed by quantity production and also the characteristics of the type of personnel which may be expected to be available to operate this equipment in the field under wartime conditions. Obviously, no quantity production equipment should be so complicated as to require the services of a trained physicist or engineer to operate satisfactory.

(4) The fourth phase is the actual quantity production of the equipment, which involves setting up the production lines with the necessary machine tool facilities, then coordinating the flow of raw materials and components to insure that the equipment will be delivered in accordance with the desired schedule and that the inventory of components and materials on hand at any time will be sufficient only to permit meeting of the delivery schedule.

(5) The production of Signal equipment during World War II was hampered in many cases by failure to realize the existence of the four phases described above and to understand the interrelation of these phases. To secure the rapid development and production of an item of equipment, it is essential that the flow of information from phase one to phase four be rapid and without confusion. To achieve this end it is essential that the personnel working on any phase maintain close liaison with the phases before and after. It is of even greater importance that the individual working on a given phase maintain liaison only with the phases before and after and that no phase be by-passed.

(6) Many instances have occurred in which the phase one personnel dealt directly with the phase four personnel, which tended to result in a piece of equipment which would demonstrate a basic theory, but which would be too complicated and not sufficiently rugged for satsifactory field use. In other cases a sharp demarkation was established between one phase and the phase next following with a result either the production of unsatisfactory equipment or a delay in time in the solution of problems would inevitably arise.

(7) For example, we will assume that phase three has been completed. A satisfactory manufacturer's model has been produced, production drawings have been completed. In seeting up hase four it is found that individual manufacturers have their own shop practices, and there will, therefore, be many cases where in order to secure the maximum output at a minimum cost, it will be necessary to make minor modifications to the production model and drawings. Placing any barrier between the phase three and phase four will inevitably result in the waste of time, money and/or quality.

1. Vehicular Installation: The experience in World War II has indicated that at some time practically every piece of military communication equipment has been required to operate from a cehicle. It is, therefore, believed that in the design of equipment this fact should be recognized and then necessary mounting brackets, shock mounts, and the like designed at the same time as is the basic equipment.

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5. Closely tied in with research and development is the problem of standardization of components of signal equipment. A continuing program is necessary whereby commercial standards and military standards can be coordinated. Components such as capacitors, resistors, meters, transformers, etc., are now being manufactured with standard markings, a minimum of types, and meeting the mechanical, electrical, and moisture-proof characteristics of military signal equipment. Identical components are produced no matter who the manufacturer may be. Had these standards been available to the manufacturer prior to the production of the first models of signal equipment for World War II the problems of development, production, supply and maintenance would have been made immeasureably simpler. (Pacific Warfare Board)

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