HUMAN FACTORS STUDY OF THE COMPATIBILITY OF THE QMC EQUIPPED SOLDIER WITH FIELD COMMUNICATIONS EQUIPMENT UNDER COLD WET CONDITIONS

John M. McGinnis, et al

Quartermaster Research and Engineering Center
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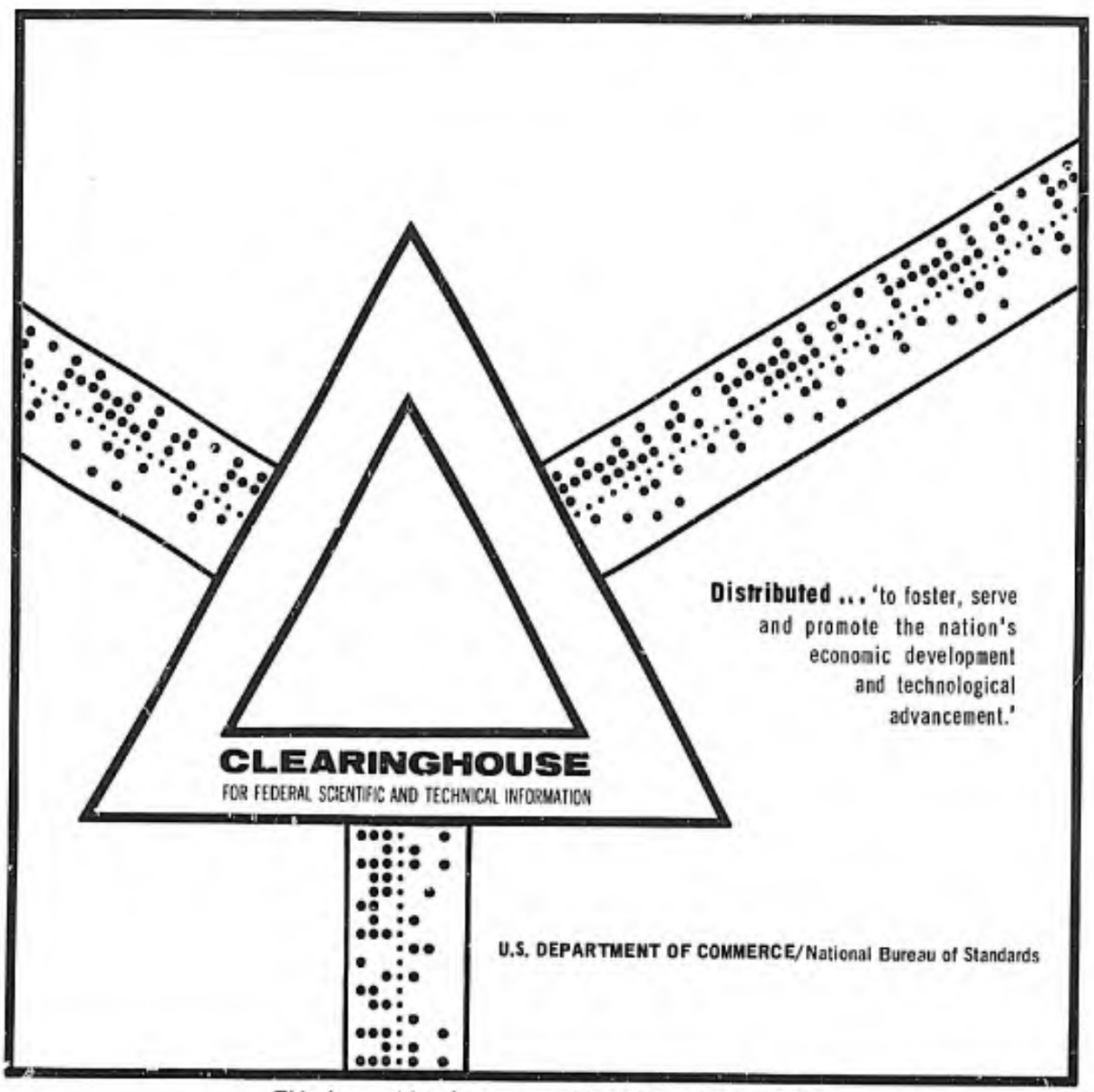

HEADQUARTERS QUARTERMASTER RESEARCH & ENGINEERING COMMAND, US ARMY
QUARTERMASTER RESEARCH & ENGINEERING CENTER
NATICK, MASSACHUSETTS

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RESEARCH STUDY REPORT

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PREPARED BY

JOHN M. McGINNIS, PH.D.
RESEARCH PSYCHOLOGIST

GEORGE ROSINGER, M.A.
RESEARCH PSYCHOLOGIST

PSYCHOLOGY BRANCH

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ABSTRACT

HUMAN FACTORS STUDY OF THE COMPATIBILITY OF THE QMC EQUIPPED SOLDIER WITH FIELD COMMUNICATIONS EQUIPMENT UNDER COLD WET CONDITIONS

INCOMPATIBILITIES WERE OBSERVED DURING THE PERFORMANCE OF TYPICAL FIELD COMMUNICATIONS ACTIVITIES WITHIN AN INFANTRY BATTLE GROUP. TWO OBSERVERS WERE ABLE TO JUDGE WITH SATISFACTORY CONSISTENCY WHETHER INCOMPATIBILITY WAS PRESENT AND IF SO TO WHAT DEGREE. HANDGEAR WAS INVOLVED IN MORE NUMEROUS AND MORE SERIOUS INCOMPATIBILITIES THAN OTHER QMC CLOTHING, QMC EQUIPMENT, OR SIGNAL CORPS EQUIPMENT. TRIGGER-FINGER MITTENS WERE INVOLVED IN MORE SERIOUS INCOMPATIBILITIES THAN WERE GLOVES.

THE OTHER QMC ITEMS FREQUENTLY INVOLVED IN INCOMPATIBILITIES WERE THE PILE CAP, THE OLD BLACK RUBBER INSULATED (MICKEY-MOUSE) BOOTS, THE HELMET AND THE HELMET LINER. NON-QMC INDIVIDUAL EQUIPMENT ITEMS INVOLVED IN A FAIR NUMBER OF INCOMPATIBILITIES, MOSTLY MINOR IN NATURE, WERE THE TE-33 TOOL EQUIPMENT, THE M-1 RIFLE, AND THE GAS MASK.

THE COMMUNICATIONS ACTIVITIES MOST SERIOUSLY INVOLVED IN INCOMPATIBILITIES WHILE WEARING QMC HANDGEAR AND COLD-WET CLOTHING WERE SPLICING FIELD WIRE, INSTALLING SWITCHBOARD SB-22/PT, AND POLE CLIMBING. INCOMPATIBILITIES RELATED TO THE OPERATION OF RADIO SETS WERE RELATIVELY FEW IN NUMBER AND WERE NOT SERIOUS.

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Human Factors Study of the Compatibility of the QMC Equipped Soldier With Field Communications Equipment Under Cold Wet Conditions

1. Introduction

A. Purpose of QMC compatibility studies

This study is part of a continuing effort by the Quartermaster Corps to insure compatibility between the QMC-equipped soldier and Army military systems which he will be required to operate. The purpose of these studies is to detect human factors problems associated with QMC clothing in the operation of equipment developed by the other Technical Services, and to report these problems to the responsible design or development groups. The ultimate goal is to insure the proper integration of QMC items with items of other Technical Services during military activities, and to increase the efficiency and reduce the cost of such integration.

A major aim of these researches is to secure a factual basis for developing testing methods which will enable detection of incompatibilities between Quartermaster Corps clothing and equipment and equipment of the other Technical Services early in the development of new QMC items. It is expected that such testing methods will aid not only in earlier detection of incompatibilities, but also in reducing their number, the number of design modifications which are now necessary late in the development of items and the amount of costly field testing required.

B. Selection of military activites for study

While searching for background material for this study, military history was considered as a source of descriptions which might be used as a basis for selecting important combat activities for investigation. A survey of a few books in this field disclosed that, although valuable sources of background information, they did not furnish the detail sought concerning the activities of individual soldiers during combat (5, 6, 7).

However, usable material was found in other reports (2, 8). Also, a detailed analysis and classification of combat fundamentals was found in a report by the Human Resources Research Office (3). In addition, a somewhat similar, although less detailed classification was available in a report of research done under a QMC contract with Psychological Research Associates (4).

Since more troops are in the Infantry than in any of the other Combat Arms, Infantry activites were chosen for study. A table of Organization and Equipment for the Infantry Rifle Company was examined (1). The 11 Signal Corps items listed were considered to be a more manageable number

FOR USE IN AN EXPLORATORY STUDY THAN THE 27 ORDNANCE ITEMS. IN ADDITION, QMC PSYCHOLOGISTS HAD PREVIOUSLY CONDUCTED STUDIES OF THE INCOMPATIBILITY OF THE QMC CLOTHED MAN WITH ORDNANCE MISSILE SYSTEMS. FOR THESE AND OTHER REASONS, COMMUNICATION, A COMBAT FUNDAMENTAL WHICH WAS INCLUDED IN BOTH THE HUMRRO AND PSYCHOLOGICAL RESEARCH ASSOCIATES CLASSIFICATIONS, WAS SELECTED FOR STUDY. IN ORDER TO BE AS UP TO DATE AS POSSIBLE WITH REGARD TO COMMUNICATIONS EQUIPMENT AND MILITARY CONCEPTS, IT WAS CONSIDERED ADVANTAGEOUS TO CONDUCT THE STUDY IN A STRATEGIC ARMY CORPS (STRAC) INFANTRY BATTLE GROUP ORGANIZED IN ACCORDANCE WITH THE PENTOMIC CONCEPT. ALSO, THE NUMBER OF COMMUNICATIONS EQUIPMENT ITEMS AND COMMUNICATIONS ACTIVITIES WITHIN A BATTLE GROUP WAS JUDGED TO BE SUFFICIENTLY LARGE TO FURNISH AN ADEQUATE VARIETY OF ACTIVITIES FOR STUDY, BUT NOT TOO LARGE FOR THE MANPOWER, TIME, AND OTHER FACILITIES AVAILABLE. AS A RESULT OF THESE CONSIDERATIONS, A DECISION WAS MADE TO STUDY THE FIELD COMMUNICATIONS ACTIVITIES WITHIN AN INFANTRY BATTLE GROUP.

C. GOALS OF THE STUDY

THE PRESENT STUDY EMPHASIZES THE DETECTION OF INCOMPATIBILITIES BETWEEN THE COMBAT-EQUIPPED SOLDIER WEARING QMC COLD-WET CLOTHING, AND FIELD COMMUNICATIONS ACTIVITIES INVOLVING THE USE OF SIGNAL CORPS EQUIPMENT. PARTICULAR ATTENTION WAS PAID TO 1) THE EFFECTIVENESS OF THE QMC CLOTHING, 2) ITS COMPATIBILITY WITH THE OPERATIONAL REQUIREMENTS OF THE SIGNAL CORPS FIELD EQUIPMENT, AND 3) THE EFFICIENCY WITH WHICH QMC CLOTHED TROOPS PERFORM FIELD COMMUNICATIONS ACTIVITIES.

IT IS BELIEVED THAT THE DATA PRESENTED IN THIS REPORT WILL PROVIDE USEFUL GUIDANCE FOR THE DESIGN AND DEVELOPMENT GROUPS CONCERNED WITH THE CLOTHING AND EQUIPMENT PROBLEMS OBSERVED. HOWEVER, IT IS POSSIBLE THAT SOME PROBLEMS HAVE BEEN DESCRIBED WHICH HAVE ALREADY BEEN RECOGNIZED BY THE DESIGNERS INVOLVED, OR ARE EVEN NOW BEING CORRECTED IN NEW DESIGNS AND DEVELOPMENTS. ISOLATED COMPLAINTS AND DIFFICULTIES WHICH APPEARED TO BE INSIGNIFICANT ARE NOT INCLUDED IN THIS REPORT.

THE ULTIMATE GOAL OF THIS STUDY IS TO FURNISH A FACTUAL BASIS FOR DEVELOPING A MINIATURE TEST SITUATION (AND RELATED PROCEDURES) CAPABLE OF DETECTING MOST OF THE INCOMPATIBILITIES WHICH MAY OCCUR BETWEEN NEW OR MODIFIED QMC ITEMS OF CLOTHING AND EQUIPMENT AND MUCH OF THE STANDARD SIGNAL CORPS EQUIPMENT USED IN THE FIELD COMMUNICATIONS ACTIVITIES OF AN INFANTRY BATTLE GROUP.

D. BACKGROUND OF THE STUDY

(1) GENERAL

THE STUDY WAS CONDUCTED AT FORT DEVENS, MASSACHUSETTS BETWEEN 19 JANUARY AND 20 FEBRUARY 1959 WITH COMMUNICATIONS PERSONNEL FROM

Rifle Companies A, B, C, and D, the Mortar Battery, and the Headquarters Communications Platoon of the First Battle Group, Fourth Infantry Division. A total of 25 communications personnel were observed performing the activities chosen for study. The men ranged in age from 19 to 37 and in rank from Pfc to Sergeant First Class. Job training and experience in communications work varied from two months to 11 years, and length of service in the Army from one to 12 years. Excellent cooperation was received from all of the Fort Devens personnel involved.*

(2) Conditions during the study

Most of the observations were made in wooded areas, but a few observations were made in open areas near the communications buildings. During the course of the study the temperatures ranged from -1° to 48°F. The wind speed ranged from 1 mph to 42 mph. Windchill varied from 500 to 1575 kilogram calories per square meter per hour.** The ground covering differed from day to day. On most days the ground was covered with snow and slush or ice. On other days, when the ground was not covered, it was either frozen, or wet and muddy. Throughout the study the weather data available at Fort Devens were used. During the latter part of the study these data were supplemented by sling psychrometer temperature readings*** and hand anemometer wind readings,**** made in the work area. Detailed weather data are given in Appendix A.

(3) Clothing and equipment involved

The EM observed were usually wearing the QMC cold-wet uniform. In addition they carried their weapons, bayonets, gas masks, combat packs, and other equipment ordinarily worn or carried by communications

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*Special acknowledgement should be made of the excellent support furnished by SFC A.J.C. Nielson, Office of the Assistant G-1, Post H.Q., by 1st Lt. R.F. Hoffman, who served effectively as liaison officer; and by 1st Lt. H.A. Myrick, CO of the Headquarters Communications Platoon, who advised on technical matters and assisted in many other ways. Excellent cooperation was also received from the CO's of Rifle Companies A, B, C, and D and the Mortar Battery.

**The authors are aware of the criticisms which have been made concerning the windchill concept. It is used here only as a convenient rough indication of the combined cooling effects of wind and low air temperature.

***US Army Signal Corps standard Psychrometer, Sling, ML-24, Range -35 to +115 (Fahrenheit), manufactured by Weksler, New York, N. Y.

****US Army Signal Corps standard 4 in. Portable Hand Anemometer, manufactured by the Davis Instrument Co., Baltimore, Maryland.

PERSONNEL IN A COMBAT SITUATION. ALL OF THE ITEMS OF QMC CLOTHING AND EQUIPMENT WORN OR CARRIED, WEAPONS AND OTHER EQUIPMENT CARRIED, THE SIGNAL CORPS COMMUNICATIONS EQUIPMENT, AND OTHER EQUIPMENT USED ARE LISTED IN APPENDIX B. HOWEVER, IT SHOULD BE NOTED THAT NOT ALL OF THE CLOTHING AND EQUIPMENT ITEMS LISTED WERE USED BY EACH ENLISTED MAN OBSERVED. POST POLICY PERMITTED SOME VARIATION IN CLOTHING WORN. AS A RESULT, BOTH THE CLOTHING AND EQUIPMENT VARIED SOMEWHAT FROM MAN TO MAN, FROM COMPANY TO COMPANY, WITH THE WEATHER, AND ACCORDING TO THE MAN'S JOB. FOR THIS REASON, RECORDS WERE KEPT OF THE CLOTHING AND EQUIPMENT ACTUALLY USED BY EACH SOLDIER WHO WAS OBSERVED.

(4) FIELD COMMUNICATIONS ACTIVITIES

BEFORE THE STUDY BEGAN, CONSULTATIONS WERE HELD WITH FORT DEVENS SIGNAL CORPS AND INFANTRY OFFICERS CONCERNING THE NATURE OF THE COMMUNICATIONS ACTIVITIES WITHIN THE INFANTRY BATTLE GROUP. FOLLOWING THESE DISCUSSIONS, A DECISION WAS MADE TO STUDY THE COMMUNICATIONS ACTIVITIES OF THE RIFLE COMPANIES AND MORTAR BATTERY, AND SOME OF THE COMMUNICATIONS ACTIVITIES OF THE BATTLE GROUP HEADQUARTERS COMMUNICATIONS PLATOON. COMMUNICATIONS BETWEEN THE BATTLE GROUP HEADQUARTERS AND HIGHER HEADQUARTERS WERE NOT INCLUDED. A TOTAL OF 16 COMMUNICATIONS ACTIVITIES WERE OBSERVED.

2. METHOD

A. GENERAL

THE METHOD OF COLLECTING DATA CONSISTED PRIMARILY OF DIRECT OBSERVATIONS TO DETERMINE WHETHER INCOMPATIBILITIES OCCURRED DURING THE PERFORMANCE OF TYPICAL FIELD COMMUNICATIONS DUTIES BY COMMUNICATIONS PERSONNEL.

B. ANALYSIS OF COMMUNICATIONS ACTIVITIES

PRIOR TO, AND AS A BASIS FOR STUDYING COMPATIBILITY, IT WAS CONSIDERED NECESSARY FOR THE TWO OBSERVERS TO BECOME THOROUGHLY FAMILIAR WITH THE PARTICULAR COMMUNICATION ACTIVITY WHICH WAS TO BE STUDIED. FIRST, THE ACTIVITY WAS WATCHED ONE OR MORE TIMES BY BOTH OBSERVERS. EACH OBSERVER THEN INDEPENDENTLY ANALYZED THE ACTIVITY INTO STEPS. FOLLOWING DISCUSSION (AND ADDITIONAL OBSERVATIONS WHEN REQUIRED), THE OBSERVERS AGREED UPON A LIST OF STEPS CONSIDERED BY BOTH TO BE SATISFACTORY. THE STEPS WERE MADE SIMPLE ENOUGH TO PERMIT ACCURATE AND CONSISTENT OBSERVATIONS OF WHAT OCCURRED DURING EACH STEP.

EACH STEP WAS THEN OBSERVED SEPARATELY AND OBSERVATIONS RECORDED. A FORM WAS DEVELOPED AND PRINTED ON CARD STOCK TO FACILITATE RECORDING (APPENDIX C). ONE LINE WAS USED TO DESCRIBE EACH STEP, TO RATE ITS IMPORTANCE ON A 5 POINT SCALE, TO LIST ANY KEY-POINTS, AND TO RECORD THE FOLLOWING: POSTURE DURING THE STEP, ANY LOCOMOTION INVOLVED, SENSORY PROCESSES USED

DURING THE STEP, TYPE OF GRASP USED, OTHER MANUAL MOVEMENTS, AND ADDITIONAL BODILY MOVEMENTS OTHER THAN THOSE RELATED TO THE TYPE OF LOCOMOTION USED. MUCH OF THIS DETAILED INFORMATION CONCERNING WHAT OCCURRED DURING EACH STEP WAS SECURED FOR ANOTHER PURPOSE, AND NOT ALL OF IT IS INCLUDED IN THIS REPORT. HOWEVER, MUCH OF IT PROVED TO BE VERY VALUABLE IN DESCRIBING THE EXACT NATURE OF THE RESPONSES MADE BY THE TEST SUBJECTS AT THE TIME WHEN INCOMPATIBILITIES WERE OBSERVED. THE REVERSE SIDE OF THE FORM WAS USED TO RECORD THE SUBJECT'S NAME, RANK, AGE, JOB TITLE, AMOUNTS OF TRAINING AND EXPERIENCE, AND OTHER PERSONAL DATA, THE CLOTHING WORN, THE EQUIPMENT AND WEAPON(S) CARRIED, AND THE EXISTING WEATHER CONDITIONS. IN ADDITION, SPACE REMAINED FOR RECORDING DETAILED DESCRIPTIONS OF INCOMPATIBILITIES OBSERVED AS DESCRIBED IN THE NEXT SECTION.

c. Recording and Evaluating Incompatibilities

DURING EACH STEP OF EACH COMMUNICATION ACTIVITY STUDIED THE TWO OBSERVERS DETERMINED WHETHER INCOMPATIBILITIES OCCURRED AS THE MEN OPERATED THE EQUIPMENT. THE OBSERVERS INDEPENDENTLY MADE AND RECORDED THEIR JUDGMENTS AS EACH OF THE 25 COMMUNICATIONS PERSONNEL PERFORMED EACH OF THE STEPS OF ONE OR MORE OF THE 16 TYPICAL FIELD COMMUNICATIONS ACTIVITIES. IN ADDITION TO JUDGING THE OCCURRENCE OR NON-OCCURRENCE OF INCOMPATIBILITY, THE INCOMPATIBILITIES NOTED WERE RATED ON A THREE-STEP SCALE AS "1," BOTHERSOME; "2," HARD TO DO; OR "3," IMPOSSIBLE, OR NEARLY SO.

IN ORDER TO PERMIT ACCURATE OBSERVATION AND ADEQUATE RECORDING, IT WAS OFTEN NECESSARY TO HAVE THE ACTIVITIES PERFORMED ONE STEP AT A TIME, OFTEN VERY SLOWLY, AND TO HAVE STEPS REPEATED UNTIL EACH OBSERVER WAS SATISFIED WITH HIS JUDGMENTS.

THE DIRECT OBSERVATION OF INCOMPATIBILITIES WAS SUPPLEMENTED BY RECORDS OF COMMENTS MADE BY THE COMMUNICATIONS PERSONNEL, EITHER SPONTANEOUSLY OR IN REPLY TO QUESTIONS.* NEARLY ALL OF THE COMMENTS WERE CONCERNED WITH THE SUITABILITY OF THE CLOTHING FOR OPERATING THE SIGNAL CORPS EQUIPMENT AND FOR PERFORMING THE STEP OBSERVED. HOWEVER, SOME COMMENTS DEALT PRIMARILY WITH THE EQUIPMENT.

IN ADDITION TO THE OBSERVATIONS AND INTERVIEWS, THE OBSERVERS THEMSELVES OPERATED SOME OF THE EQUIPMENT, AND THEY OBTAINED A NUMBER OF ADDITIONAL COMMENTS FROM OFFICERS.

3. Results

a. Reliability of Incompatibility Judgments

IN ORDER TO DETERMINE THE RELIABILITY WITH WHICH THE TWO OBSERVERS COULD JUDGE THE PRESENCE OR ABSENCE OF INCOMPATIBILITIES DURING FIELD

*BEFORE OBSERVATIONS WERE BEGUN THE EM WERE INSTRUCTED TO REPORT ANY PROBLEMS RESULTING FROM THE CLOTHING WORN. MOST OF THEM COMMENTED QUITE FREELY.

COMMUNICATION OPERATIONS, THEIR INDEPENDENT JUDGMENTS WERE COMPARED FOR A LARGE SAMPLE OF THE DATA. ALL OF THE OBSERVATIONS WHICH HAD BEEN SECURED FROM THE FOUR RIFLE COMPANIES (459 PAIRS OF JUDGMENTS) WERE USED FOR THIS PURPOSE. OF THE 459 PAIRS, 425 OR 92.6% OF THE JUDGMENTS WERE IN EXACT AGREEMENT, I.E., BOTH "NO INCOMPATIBILITY," BOTH "BOTHERSOME," BOTH "HARD TO DO," OR BOTH "IMPOSSIBLE." A SMALL PROPORTION, 4.8% DIFFERED BY ONE STEP (E.G., ONE JUDGMENT OF "NO INCOMPATIBILITY" AND OF "BOTHERSOME," ONE OF "BOTHERSOME" AND THE OTHER OF "HARD TO DO," OR ONE OF "HARD TO DO" AND THE OTHER OF "IMPOSSIBLE"). ONLY 2.6% OF THE JUDGMENTS DIFFERED BY MORE THAN ONE STEP. THIS SATISFACTORY DEGREE OF AGREEMENT BETWEEN THE JUDGMENTS OF THE TWO OBSERVERS ON THE SAME STEPS INCREASES CONFIDENCE IN THE OBJECTIVITY AND CORRECTNESS OF THE JUDGMENTS.

B. USE OF THE INCOMPATIBILITY TABLES (TABLES I-XIII)

FOR CONVENIENCE IN ANALYSIS AND REPORTING, ALL OF THE INCOMPATIBILITY DATA (OTHER THAN RELIABILITY DATA) FROM THE MORTAR BATTERY, HEADQUARTERS COMMUNICATIONS PLATOON, AND THE RIFLE COMPANIES HAVE BEEN SUMMARIZED IN TABLES I-XIII. EACH TABLE LISTS ALL OF THE INCOMPATIBILITIES OBSERVED DURING ALL THE STEPS OF ONE ACTIVITY. HOWEVER, STEPS IN WHICH NO INCOMPATIBILITIES WERE EVER OBSERVED HAVE BEEN OMITTED IN ORDER TO SIMPLIFY THE TABLES.

THE FIRST COLUMN IN THE "INCOMPATIBILITY TABLES" DESCRIBES THE INCOMPATIBILITIES OBSERVED. COLUMN 2, "CLOTHING INVOLVED," LISTS THE CLOTHING ITEM OR ITEMS OBSERVED OR ASSOCIATED WITH THE INCOMPATIBILITY. COLUMN 3, "N," GIVES THE TOTAL NUMBER (OF COMMUNICATIONS MEN) WHO PERFORMED THE STEP IN WHICH THE PARTICULAR INCOMPATIBILITY WAS SOMETIMES OBSERVED.

WHEN COLUMN 2 LISTS MORE THAN ONE TYPE OF CLOTHING, SEPARATE ENTRIES ARE MADE FOR EACH TYPE OF CLOTHING IN COLUMNS 3, 4 AND 5.

COLUMN 4 SHOWS THE NUMBER OF TIMES BOTH OBSERVERS INDEPENDENTLY RATED EACH INCOMPATIBILITY AS 1-"BOTHERSOME," 2-"HARD TO DO," OR 3-"IMPOSSIBLE OR PRACTICALLY IMPOSSIBLE." WHEN THE TWO RATINGS DID NOT AGREE, A VALUE OF 1/2 IS ENTERED UNDER THE APPROPRIATE HEADING FOR EACH OBSERVER. FOR EXAMPLE, IF ONE OBSERVER RATES THE INCOMPATIBILITY AS "BOTHERSOME," A VALUE OF 1/2 IS ENTERED UNDER THAT HEADING AND A VALUE OF 1/2 IS LIKEWISE ENTERED UNDER THE HEADING USED BY THE OTHER RATER. COLUMN 5, "TOT. NO. INC." SHOWS THE NUMBER OF MEN WHO MET WITH THE INCOMPATIBILITY.

COLUMN 6 LISTS THE EQUIPMENT ITEMS INVOLVED IN THE INCOMPATIBILITY. COLUMN 7 INDICATES THE OBSERVERS' EVALUATION OF THE IMPORTANCE OF EACH STEP AS "C" (CRITICAL-NECESSARY IN ORDER TO PERFORM THE ACTIVITY), "I" (IMPORTANT- BUT NOT ABSOLUTELY NECESSARY), "R" (ROUTINE- THE WAY THE JOB IS ORDINARILY DONE), OR "U" (UNNECESSARY- THERE WOULD BE NO REAL DISADVANTAGES IF THE STEP WERE NOT PERFORMED). THE TWO OBSERVERS DISCUSSED

THE DEGREE OF IMPORTANCE OF EACH STEP AND WHEN NECESSARY, SECURED SUPPLEMENTARY INFORMATION UNTIL AGREEMENT WAS REACHED. THE LAST COLUMN, 8, IS FOR "REMARKS."

c. INCOMPATIBILITIES OBSERVED DURING COMMUNICATIONS ACTIVITIES

TABLES I-XIII AND THE ACCOMPANYING SUMMARIES DESCRIBE IN DETAIL THE INCOMPATIBILITIES OBSERVED DURING 13 OF THE ACTIVITIES. THERE ARE NO TABLES HEADED "WIRE LAYING BY TWO MEN USING REEL UNIT, RL-159/U AND RL-31," RECOVERY OF WIRE BY TWO MEN USING REEL UNIT RL-159/U AND RL-31," OR "RECOVERY OF WIRE BY VEHICLE," BECAUSE THE VERY SMALL NUMBER OF INCOMPATIBILITIES OBSERVED IN RELATION TO THESE ACTIVITIES HAVE BEEN INCLUDED IN OTHER TABLES, WITH APPROPRIATE EXPLANATORY REMARKS.

TABLES SHOWING INCOMPATIBILITIES OBSERVED
DURING COMMUNICATIONS ACTIVITIES

TABLE I: INSTALLATION OF TERMINAL STRIP, TM-184

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
TYING TERMINAL STRIP TO VERTICAL SUPPORT W/HANDGEAR ON	GLOVE W/INSERT	4	2	1		3	TM-184; FIELD WIRE	1	
	MITTEN W/INS.	1	1			1			
TAGGING WIRE W/HANDGEAR ON	GLOVE W/INS.	7*	2	2½*	½	5*	TAG; FIELD WIRE	C	*4 OF THESE MEN WERE OBSERVED IN TAGGING WIRE, BUT NOT IN RELATION TO INSTALLING TERM. STRIP
	MITTEN W/INS.	2		1	1	2*			
TE-33 TOOL EQUIPMENT CANNOT BE ATTACHED TO CARTRIDGE BELT							TE-33; CARTRIDGE BELT		

SUMMARY: THE TWO PREDOMINANT INCOMPATIBILITIES NOTED WERE TYING THE TERMINAL STRIP TO A VERTICAL SUPPORT AND TAGGING WIRE WHILE WEARING HANDGEAR. IN ADDITION THE TE-33 TOOL EQUIPMENT CANNOT BE ATTACHED TO THE CARTRIDGE BELT UNLESS MAKESHIFT MEANS OF ATTACHMENT ARE USED, ALTHOUGH IT WILL ATTACH EASILY TO THE PISTOL BELT AND GAS MASK STRAP.

TABLE II: INSTALLATION OF SWITCHBOARD, TELEPHONE, MANUAL, SB-22PT (FIG. 1)

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
REMOVING FRONT SWITCHBOARD COVER W/HANDGEAR ON	GLOVE W/INS.	5	1	1		2	SB-22/PT	C	
OPENING REAR COVER OF SWITCHBOARD W/HANDGEAR ON	GLOVE W/INS.	5			5	5	SB-22/PT	C	GLOVE MUST BE REMOVED OR A TOOL USED
INSERTING WIRE INTO SWITCHBOARD TERMINALS W/HANDGEAR ON	GLOVE W/INS.	5	2	2		4	SB-22/PT; FIELD WIRE	C	
MUST TAKE OFF PILE CAP AND HELMET TO PUT ON HEADSET	PILE CAP	5	2			2	HELMET	I	
HELMET LOOSE WHEN PILE CAP IS WORN UNDERNEATH; HELMET TENDS TO SLIDE FORWARD WHEN MAN BENDS OR LEANS*	PILE CAP						HELMET		*TRUE FOR MOST SUBJECTS
ATTACHING WIRE TO GROUND ROD HOLDING WIRE UNDER SCREW WHILE TIGHTENING LATTER (W/ SCREWDRIVER) W/HANDGEAR ON*	GLOVE W/INS.	2		1	1	2	GROUND ROD; FIELD WIRE	I	*THIS DIFFICULTY MIGHT BE TRUE FOR ALL SUBJECTS, HOWEVER, ONLY 2 SUBJECTS WERE OBSERVED ATTACHING WIRE TO GROUND ROD
LOOSENING SCREW ON GROUND ROD W/HANDGEAR ON	GLOVE W/INS.	1		1		1	GROUND ROD	I	

SUMMARY: THE OUTSTANDING INCOMPATIBILITIES NOTED WERE OPENING THE REAR COVER OF THE SWITCHBOARD (FIG. 1), AND INSERTING WIRES INTO THE SWITCHBOARD TERMINALS WHILE WEARING THE FIVE FINGER GLOVE AND INSERT. IT IS IMPOSSIBLE TO GET THE GLOVED FINGER INTO THE CATCH ON THE REAR COVER MAKING IT NECESSARY TO REMOVE THE GLOVE IN ORDER TO DO THE JOB. HOWEVER, THE CATCH CAN BE RELEASED WITH A TOOL, E.G., A SCREWDRIVER. MOST MEN PROBABLY WOULD HAVE HAD DIFFICULTY IN ATTACHING WIRE TO THE GROUND ROD; HOWEVER, ONLY TWO MEN WERE OBSERVED PERFORMING THIS STEP.

WHEN THE PILE CAP IS WORN THE HELMET IS NOT FIRMLY SECURED UNLESS THE CHIN STRAP IS USED. AS A RESULT THE HELMET TENDS TO SLIDE FORWARD WHEN THE WEARER BENDS OR LEANS.

TABLE III: INSTALLATION OF EMERGENCY SWITCHBOARD, SB-18/GT (FIG. 2, 4)

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
REMOVING THE ADAPTER PLUGS FROM THE CASE W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS. CIVILIAN GLOVE	4 2 1	1 1	3 1	1	4 1	SB-18/GT 1	C	
UNSCREWING ADAPTER PLUG TERMINALS W/HANDGEAR ON*	GLOVE W/INS. MITTEN W/INS. CIVILIAN GLOVE	4 2 1	2			2 0 0	SB-18/GT	C	*THIS STEP IS NOT ALWAYS NECESSARY - SOMETIMES TERMINALS ARE LEFT OPEN
INSERTING WIRE INTO ADAPTER PLUGS W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS. CIVILIAN GLOVE	4 2 1	1 1			1 0 1	SB-18/GT	C	
SCREWING DOWN ADAPTER PLUG TERMINALS W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS. CIVILIAN GLOVE	4 2 1	2* 1	1		2 1 1	SB-18/GT	C	*ONE ADDITIONAL RATING OF BTHR. WAS MADE ON THE BASIS OF A SUBJECT'S OPINION
TYING FREE END OF WIRE TO RING ON CASE OF PHONE TA-312/PT W/HANDGEAR ON*	GLOVE W/INS. MITTEN W/INS. CIVILIAN GLOVE	2 1 1	1			0 0 1	TA-312/PT; FIELD WIRE	R	*SOME SUBJECTS CONSIDER THIS STEP UNNECESSARY

SUMMARY: THE OUTSTANDING INCOMPATIBILITIES NOTED WERE REMOVING THE ADAPTER PLUGS FROM THE CASE AND SCREWING DOWN THE PLUG TERMINALS WHILE WEARING GLOVES. (FIG. 2)

TABLE IV: INSTALLATION OF TELEPHONE SET, TA-312/PT (FIG. 3, 4)

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
LOOSENING COVER RETAINING STRAP W/HANDGEAR ON	GLOVE W/INS.	5	1	*		1	TA-312/PT	C	*ONE RATING OF HARD, BASED ON SUBJECT'S OPINION
	MITTEN W/INS.	1	½	½		1			
	CIVILIAN GLOVE	1	1			1			
OPENING BATTERY BOX W/HANDGEAR ON*	GLOVE W/INS.	5	1			1	TA-312/PT	C	*CATCH GETS STUCK WHEN PUSHED IN WRONG DIRECTION
	MITTEN W/INS.	1			1	1			
	CIVILIAN GLOVE	1		1		1			
REMOVING BATTERIES FROM BATTERY BOX W/HANDGEAR ON*	GLOVE W/INS.	5	½**	1½	1	3	TA-312/PT; BATTERIES	C	*ONE SUBJECT HAD TROUBLE DOING THIS WITH BARE HANDS
	MITTEN W/INS.	1				0			**SUBJECT'S OPINION
	CIVILIAN GLOVE	1				0			
TIGHTENING RETAINING STRAP WITH HANDGEAR ON*	GLOVE W/INS.	5	1	2**	1	4	TA-312/PT	C	*SOME SUBJECTS CONSIDER THIS STEP UNNECESSARY
	MITTEN W/INS.	1				0			**ONE ADDITIONAL RATING OF HARD WAS MADE ON THE BASIS OF SUBJECT'S OPINION
	CIVILIAN GLOVE	1			1	1			
TYING BOTTOM OF PHONE TO VERTICAL SUPPORT W/HANDGEAR ON	GLOVE W/INS.	3	1	1		2	TA-312/PT; FIELD WIRE	R	
OPENING KNIFE FOR SCREWDRIVER BLADE W/HANDGEAR ON	GLOVE W/INS.	5		1*	2**	3	KNIFE	C	*THIS SUBJECT USED HIS BAYONET TO PRY UP BLADE
	MITTEN W/INS.	1			1	1			**TWO ADDITIONAL RATINGS OF IMP. WERE MADE ON BASIS OF SUBJECTS' OPINION
	CIVILIAN GLOVE	1			1	1			
POSITIONING RECEIVER-TRANSMITTER INSIDE PILE CAP*	PILE CAP		1½	½		2**	TA-312/PT; TA-1/TT; AN/PRC-10	C	*LITTLE ROOM FOR RECEIVER WHEN MAN HAS LARGE HEAD
									**TWO CASES OBSERVED IN OTHER ACTIVITIES
LIFTING GENERATOR HANDLE UP INTO CRANKING POSITION W/-HANDGEAR ON	GLOVE W/INS.	5	2	3		5	TA-312/PT	C	
	MITTEN W/INS.	1			1	1			
	CIVILIAN GLOVE	1		1		1			

SUMMARY: ONE COMMON INCOMPATIBILITY WAS TIGHTENING THE RETAINING STRAP WHEN WEARING FIVE-FINGER GLOVES. HOWEVER, THIS STEP MAY BE UNNECESSARY. SOME OF THE MEN THOUGHT THAT THE COVER WOULD STAY ON SATISFACTORILY, EVEN IF THE RETAINING STRAP REMAINED UNFASTENED. IN ANY CASE, IT WAS ONLY NECESSARY TO UNFASTEN AND FASTEN THE RETAINING STRAP WHEN BATTERIES WERE BEING CHANGED, WHICH OCCURRED NO MORE OFTEN THAN ONCE IN 24 HOURS. TWO OTHER PREDOMINANT INCOMPATIBILITIES WERE LIFTING THE GENERATOR HANDLE UP INTO CRANKING POSITION (FIG. 3), AND OPENING THE KNIFE FOR THE SCREWDRIVER BLADE WHILE WEARING GLOVES OR MITTENS. IT SHOULD BE POINTED OUT THAT ONE MAN DID THE LATTER SUCCESSFULLY WITH HIS PLIERS, AND FOR THIS REASON NO INCOMPATIBILITY WAS RECORDED. SOMETIMES IT WAS DIFFICULT, OR EVEN IMPOSSIBLE, TO POSITION THE RECEIVER-TRANSMITTER INSIDE OF THE PILE CAP, WHEN THE EARFLAP WAS DOWN. HOWEVER, IN MOST CASES THE USER WAS ABLE TO HEAR SATISFACTORILY THROUGH THE MATERIAL OF THE CAP.

TABLE V: LAYING WIRE USING REEL EQUIPMENT, CE-11 (FIG. 5)

1	2	3	4	5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE: BTHR.	HARD	IMP.	TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
SECURING AXLE BY INSERTING COTTER PIN W/HANDGEAR ON*	GLOVE W/INS.	2	2			2	CE-11	1	*WIRE IS PROBABLY BETTER THAN A COTTER PIN FOR THIS PURPOSE
MAKING TIES W/HANGEAR ON	GLOVE W/INS.* MITTEN W/INS.	5 3	3½		¼	4 0	FIELD WIRE	1	*ONE MAN HAD NO INSERTS
WEAPON SLIDES OFF SHOULDER AND GETS IN WAY		9*	6			6*	WEAPON (M1 RIFLE*)		*FIVE CASES WERE OBSERVED IN OTHER ACTIVITIES
POLICING WIRE W/HANDGEAR*	GLOVE W/INS.	1	1			1	FIELD WIRE	?	*SENSE OF TOUCH NEEDED TO DETECT BREAKS IN THE WIRE OR DEFECTS IN THE INSULATION

SUMMARY: THE MOST FREQUENT INCOMPATIBILITY WAS MAKING TIES WHILE WEARING THE FIVE-FINGER GLOVE AND INSERT. GLOVES SLOW DOWN PERFORMANCE ON THE TASK AND THE MEN USE LONGER SECTIONS OF WIRE TO MAKE THE TIES. INSERTING A COTTER PIN IN A HOLE IN THE AXLE TO SECURE THE LATTER WAS BOTHERSOME WITH GLOVES. MOST WIREMEN USED A SHORT PIECE OF FIELD WIRE INSTEAD. THIS IS PROBABLY A MORE EFFICIENT WAY TO DO THE JOB. SEVERAL MEN HAVE INDICATED THAT THE M1 RIFLE WAS TOO LARGE, HEAVY AND AWKWARD FOR COMMUNICATION PERSONNEL, BECAUSE OF THE NECESSITY OF INSTALLING COMMUNICATIONS AS RAPIDLY AS POSSIBLE. THEY WOULD PREFER THE CARBINE BECAUSE OF ITS COMPARITIVE SMALL SIZE AND LIGHT WEIGHT. EITHER WEAPON SLIDES OFF THE SHOULDER AND GETS IN THE WAY. (FIG. 4, 5, 7, 10)

TABLE VI: SPLICING FIELD WIRE, WD-1/TT (FIG. 6)

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
TYING SQUARE KNOT W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 2		4	2*	4 2*	FIELD WIRE; WD-1/TT	C	*ONE ADDITIONAL RATING OF IMP. MADE ON BASIS OF SUBJECT'S OPINION
WRAPPING ENDS OF WIRE AROUND EACH SIDE W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 2	2		2*	2 2*	FIELD WIRE	I	*ONE ADDITIONAL RATING OF IMP. MADE ON BASIS OF SUBJECT'S OPINION
CUTTING OR TEARING OFF RUBBER TAPE W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 2		1*	1	2 0	RUBBER TAPE	C	*ONE ADDITIONAL RATING OF HARD MADE ON BASIS OF SUBJECT'S OPINION
TAPING SPLICE W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 2	1	2*	1 2	4* 2	RUBBER TAPE; FIELD WIRE	C	*ONE ADDITIONAL RATING OF HARD MADE ON BASIS OF SUBJECT'S OPINION
ROLLING TAPE BETWEEN PALMS TO MAKE IT HOLD FIRMLY W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS. CIVILIAN GLOVE	4 1 1	1	½* 1	1½ 1	3 1 1	TAPED FIELD WIRE	I	*ONE ADDITIONAL RATING OF HARD-IMP. MADE ON BASIS OF SUBJECT'S OPINION

SUMMARY: TYING THE SQUARE KNOT AND TAPING THE SPLICE PROPERLY WHILE WEARING GLOVES OR MITTENS ARE THE TWO MOST FREQUENT INCOMPATIBILITIES. TYING THE SQUARE KNOT (W/GLOVES ON) IS PROBABLY THE MOST DIFFICULT PART OF THE TASK. (FIG. 6) TWO OTHER COMMON INCOMPATIBILITIES WERE WRAPPING THE ENDS OF WIRE AROUND EACH SIDE OF THE SPLICE, AND ROLLING THE TAPE BETWEEN THE PALMS TO MAKE IT HOLD FIRMLY WHILE WEARING GLOVES. THE LATTER REQUIRES HEAT FROM THE HAND TO MAKE THE TAPE STICK, AND NOT ENOUGHT HEAT IS CONDUCTED FROM THE GLOVED HAND.

IN GENERAL, LOW TEMPERATURES MAKE THE INSULATION ON FIELD WIRE STIFF AND SOMEWHAT DIFFICULT TO HANDLE.

TABLE VII: Recovery of Wire with Reel Equipment, CE-11 (Fig. 7)

1	2	3	4			5	6	7	8
Area of Incompatibility	Clothing Involved	N	Freq. of Incompatibility by Degree			Tot. No. Inc.	Equipment Involved in Incompat.	Imp. of Step	Remarks (Asterisked remarks refer to material in that row)
			Bthr.	Hard	Imp.				
Adjusting body strap w/hand-gear on*	Glove w/ins.	1		$\frac{1}{2}$	$\frac{1}{5}$	1	ST-34 Body Strap	R	*This step not always necessary
Tying end of wire to spool	Glove w/ins. Mitten w/ins.	5 2	2 1	 1	 	2 2	DF-8-A; Spool; Field wire	C	

SUMMARY: No serious incompatibilities were involved in this activity, although a few men had some difficulty in tying the end of the wire to the spool when wearing gloves.

TABLE VIII: Overheading Wire with Wire Pike, MC-123

1	2	3	4			5	6	7	8
Area of Incompatibility	Clothing Involved	N	Freq. of Incompatibility by Degree			Tot. No. Inc.	Equipment Involved in Incompat.	Imp. of Step	Remarks (Asterisked remarks refer to material in that row)
			Bthr.	Hard	Imp.				
Helmet slides or falls off when overheading			5	1		6*	Helmet		*Two cases were observed in relation to another activity
Wire pike too short and heavy*		5				2*	Wire pike		*Subject's opinion

SUMMARY: The most common incompatibility noted was the sliding or falling off of the helmet when the wearer leaned forward or backward, since the men usually did not fasten the chin strap on the helmet. Two men commented that the wire pike was too short for heights that wiremen must reach in some situations. Often a branch or a makeshift pole was used.

TABLE IX: LAYING WIRE BY VEHICLE

1	2	3	4	5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE	TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR. HARD IMP.				
INTRENCHING TOOL AND GAS MASK* GET IN WAY WHILE MAN IS SEATED IN VEHICLE OPERATING BRAKE ON RL-31 REEL UNIT		5	4½** ½	5	INTRENCHING TOOL; GAS MASK		*THESE ITEMS ARE NOT USUALLY WORN IN COMBAT WHEN THIS JOB IS DONE (LAID DOWN IN VEHICLE)
BLACK INSULATED RUBBER BOOT***					INSULATED RUBBER BOOT		**TWO RATINGS WERE NOTED WHEN WIRE WAS RECOVERED BY VEHICLE ***SEE FOOTNOTE

SUMMARY: ONE COMMON INCOMPATIBILITY OBSERVED WAS THAT THE INTRENCHING TOOL AND GAS MASK "GOT IN THE WAY" WHILE THE MEN WERE OPERATING THE BRAKE ON THE RL-31 AXLE WHILE SEATED. HOWEVER, ACCORDING TO COMMENTS MADE BY THE MEN, IN A COMBAT SITUATION, THESE ITEMS ARE USUALLY LAID DOWN IN THE VEHICLE RATHER THAN WORN.

ALMOST ALL OF THE MEN INTERVIEWED (APPROXIMATELY 40) WITH REGARD TO THE BLACK INSULATED RUBBER BOOT INDICATED THAT IT WAS SATISFACTORY FOR KEEPING THE FEET WARM. HOWEVER, ALMOST WITHOUT EXCEPTION THE MEN STATED THAT THE BOOTS WERE HIGHLY UNSATISFACTORY FOR EXTENSIVE MARCHING, AND THAT THEY WERE TOO HEAVY AND CLUMSY FOR RUNNING. THE MEN COMPLAINED THAT THEIR FEET PERSPIRE AND BLISTER WHEN THE BOOT IS USED FOR LONG DISTANCE WALKING OR MARCHING. ALSO, THEY CHAFE THE ANKLES AND ADEQUATE ARCH SUPPORT IS LACKING.***

***QM R&E FOOTWEAR & HANDWEAR BRANCH HAS DEVELOPED AN IMPROVED RUBBER INSULATED BOOT WHICH IS EXPECTED TO ELIMINATE CHAFING AT THE BOOT TOP. IT IS LIGHTER IN WEIGHT, AND HAS PROVEN TO BE MUCH EASIER TO DON, DOFF, AND MARCH IN THAN THE BOOT NOW BEING USED BY TROOPS AT FORT DEVENS. THE IMPROVED BOOT IS NOT YET IN THE SUPPLY CHANNELS AT FORT DEVENS.

TABLE X: POLE CLIMBING USING CLIMBERS, LC-240/U AND LINEMAN'S SAFETY BELT

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY.	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
INSERTING LEG IRON INTO LEG PAD W/HANDGEAR ON	GLOVE W/INS.	3	1	1*		2	LEG IRON; LEG PAD	C	*COLD WEATHER MAKES LEATHER STIFF AND DIFFICULT TO MANIPULATE
INSERTING LEG STRAP THROUGH PAD AND LEG IRON*		5		1		1	LEG STRAP; PAD; LEG IRON	C	*COLD WEATHER MAKES LEATHER STIFF AND DIFFICULT TO MANIPULATE
BUCKLING AND ADJUSTING LEG STRAP WITH HANDGEAR ON*	GLOVE W/INS.	3		2		2	LEG STRAP	C	*STRAPS ARE SHORT
BUCKLING AND ADJUSTING INSTEP STRAP W/HANDGEAR ON*	GLOVE W/INS.	3		2		2	INSTEP STRAP	C	*STRAPS ARE SHORT
CANNOT PUT CLIMBERS ON OVER OVERSHOES BECAUSE STRAPS ARE TOO SHORT. INSULATED RUBBER BOOT DANGEROUS TO CLIMB IN- "GIVE" TOO MUCH*	OVERSHOES; INSULATED RUBBER BOOTS						LEG AND INSTEP STRAPS		*SUBJECT'S OPINION
POLE CLIMBING GLOVES TEND TO SLIDE OFF WHEN CLIMBING		1		1		1	POLE CLIMBING GLOVES		
UNSNAPPING SAFETY STRAP W/POLE CLIMBING GLOVES ON		1			1	1	POLE CLIMBING GLOVES	C	

SUMMARY: THE PREDOMINANT INCOMPATIBILITY WITH THE POLE CLIMBING EQUIPMENT WAS DIFFICULTY IN BUCKLING AND ADJUSTING THE LEG AND INSTEP STRAPS. THEY ARE TOO SHORT FOR EFFICIENT HANDLING WITH GLOVES, AND IN SOME CASES WITH BARE HANDS. WHEN THE LEATHER GETS STIFF AS A RESULT OF LOW TEMPERATURES THIS DIFFICULTY IS INCREASED.

FOR CLIMBING, THE WIREMEN OBSERVED PREFERRED TO WEAR THE ORDINARY STANDARD QMC FIVE FINGER GLOVES EITHER WITH OR WITHOUT INSERTS, DEPENDING ON THE WEATHER, RATHER THAN STANDARD "LINEMAN'S" GLOVES.

TABLE XI: OPERATION OF RADIO SET, AN/PRC-6

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
CONNECTING PLUG TO BATTERY W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 1	1½ 1			1½ 1	AN/PRC-6	C	
TILTING HELMET IN ORDER TO POSITION SET TO RECEIVE		7	2			2	HELMET; AN/PRC-6	C	
ADJUSTING STRAP FOR CARRYING W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 1	1		1	1 1	AN/PRC-6	R	
TIGHTENING CARRYING STRAP AFTER USE W/HANDGEAR ON*	GLOVE W/INS. MITTEN W/INS.	4 1		1**	2	2 1	AN/PRC-6	U	*THIS STEP NOT CONSIDERED NECESSARY **ONE MAN HAD DIFFICULTY W/BARE HANDS

SUMMARY: THE MOST COMMON INCOMPATIBILITY NOTED WAS TIGHTENING THE RADIO CARRYING STRAP WHILE WEARING GLOVES (AND BARE HANDED). HOWEVER, THIS STEP IS NOT AN ESSENTIAL ONE, AND IS USUALLY NOT PERFORMED BY THE MEN IN THE FIELD. A FEW MEN HAD SOME DIFFICULTY IN CONNECTING THE PLUG TO THE BATTERY WHILE WEARING GLOVES.

TABLE XII: OPERATION OF RADIO SETS, AN/PRC-9 AND 10Δ (FIG. 8, 9, 10)

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPATIBILITY BY DEGREE BTHR.	HARD	IMP.	TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
REMOVING ANTENNA BASE FROM ACCESSORY BAG W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 1	3	1* 	 1	4 1	ANTENNA BASE; ACCESSORY BAG	C	*ONE ADDITIONAL RATING OF HARD MADE ON BASIS OF SUBJECT'S OPINION
REMOVING ANTENNA FROM ACCESSORY BAG W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	4 1	 	 ½	 ½	0 1	ANTENNA; ACCESSORY BAG	C	
UNLOCKING TUNING KNOB W/HANDGEAR ON (FIG. 8)	GLOVE W/INS. MITTEN W/INS.	4 1	 	0* 	1 	1 0	AN/PRC-10	C	*ONE RATING OF HARD MADE ON BASIS OF SUBJECT'S OPINION
ADJUSTING POINTER ON DESIGNATED FREQUENCY W/HANDGEAR ON (FIG. 9)	GLOVE W/INS. MITTEN W/INS.	4 1	 	* 	 ½	0 ½	AN/PRC-10	C	*ONE RATING OF HARD MADE ON BASIS OF SUBJECT'S OPINION
PLACING PACK W/RADIO IN CARRY POSITION REQUIRES HELP	COLD-WET UNIFORM	8	3			3	AN/PRC-10	C	
SNAPPING PACK HOOKS TO BELT W/HANDGEAR ON	GLOVE W/INS. MITTEN W/INS.	2 1	1			1 0	AN/PRC-10; CARTRIDGE BELT	I	

SUMMARY: THE MOST FREQUENT INCOMPATIBILITY WAS REMOVING THE ANTENNA BASE FROM THE ACCESSORY BAG WITH GLOVES ON. USUALLY THE BAG, WHICH WAS ATTACHED TO THE RADIO, HAD TO BE TURNED UPSIDE DOWN IN ORDER TO SECURE THE ANTENNA.

SOME MEN COMMENTED THAT THEY DID NOT LIKE THE CARRYING PACK FOR THE RADIO. (FIG. 10) THEY CLAIMED THAT THE STRAPS PULLED ON THE MUSCLES, THAT THE PACK WAS HARD TO DON AND DOFF, THAT IT BUNCHED UP, AND THAT IT MADE THE RADIO SEEM MUCH HEAVIER. THE MEN INTERVIEWED ALL PREFERRED THE PACKBOARD AND QUESTIONED WHY IT WAS NO LONGER ISSUED TO THEM.

ΔTHESE TWO RADIOS WERE SO SIMILAR THAT THEIR OPERATION WAS CLASSIFIED AS ONE ACTIVITY, RATHER THAN TWO SEPARATE ONES.

TABLE XIII: OPERATION OF RADIO SET, AN/VRC-18

1	2	3	4			5	6	7	8
AREA OF INCOMPATIBILITY	CLOTHING INVOLVED	N	FREQ. OF INCOMPAT-.BILITY BY DEGREE			TOT. NO. INC.	EQUIPMENT INVOLVED IN INCOMPAT.	IMP. OF STEP	REMARKS (ASTERISKED REMARKS REFER TO MATERIAL IN THAT ROW)
			BTHR.	HARD	IMP.				
LOOSENING LOCKING SCREWS ON TUNING KNOB*							AN/VRC-18	1	*A SCREWDRIVER IS NECESSARY FOR THIS STEP (AND MANY OTHERS) BUT THIS ITEM IS NOT ISSUED TO RADIO OPERATORS
ADJUSTING STOPS W/HANDGEAR ON	GLOVE W/INS.	3				0	AN/VRC-18	1	
PUSHING COVER PLATE ASIDE W/HANDGEAR	GLOVE W/INS. MITTEN W/INS.	3 1		1*	1	1 1	AN/VRC-18	1	*ONE ADDITIONAL RATING OF HARD MADE ON BASIS OF SUBJECT'S OPINION
WHEN UNSCREWING DIAL LOCK MUST HOLD DIAL AND PLATE STEADY WITH KNOB WHILE WEARING HANDGEAR	GLOVE W/INS. MITTEN W/INS.	3 1	1			0 1	AN/VRC-18	1	
TURNING TRANSMITTER ANTENNA TUNING SCREW - MUST PUSH IN AND ROTATE SPRING LOADED SCREW	GLOVE W/INS. MITTEN W/INS.	3 1	½	½		0 1	AN/VRC-18	1	
REPLACING CAP COVERING TRANSMITTING ANTENNA TUNING SCREW	GLOVE W/INS. MITTEN W/INS.	3 1			1	0 1	AN/VRC-18	R	

SUMMARY: THE USE OF A SCREWDRIVER IS REQUIRED FOR SEVERAL STEPS OF THIS ACTIVITY. HOWEVER, RADIO OPERATORS IN THE RIFLE COMPANIES ARE NOT ISSUED THIS ITEM (TE-33 TOOL EQUIPMENT). IT SHOULD BE NOTED THAT THE AN/VRC-18 HAS BEEN MODIFIED AND THE OPERATION OF LOOSENING THE LOCKING SCREWS ON THE TUNING KNOB IS MUCH EASIER AND DOES NOT REQUIRE A SCREWDRIVER, BUT THERE ARE OTHER OPERATIONS FOR WHICH THE SCREWDRIVER IS STILL REQUIRED.

THE MOST SERIOUS INCOMPATIBILITY WAS RELEASING THE COVER PLATE, AFTER THE KNOBS HAVE BEEN LOOSENED, WHILE WEARING GLOVES. THE COVER PLATE "STICKS" AND IT IS ALMOST IMPOSSIBLE TO PULL OUT W/GLOVES ON, UNLESS A TOOL IS USED.

4. Discussion

Tables I-XIII show that large differences exist between the 16 communications activities studied, with regard to both the number and seriousness of the incompatibilities observed. However, there does not appear to be any completely satisfactory way of comparing the different activities with respect to the number and severity of the incompatibilities related to them. This is true because of variations in the number of steps involved in each activity, in the skill of the men observed, in the weather conditions at the time of the observations, in the handgear and other clothing worn, in the personal equipment used, and in other uncontrolled circumstances which might affect the results. A good example is the effect of the handgear worn. QMC trigger-finger mittens were involved in a much higher proportion of severe incompatibilities than were the QMC five-fingered gloves.

Therefore in order to compare the various communications activities fairly with respect to severity of occurrence of incompatibilities, only the data for one type of handgear should be used for computing "incompatibility index" values. Additional information supporting this conclusion will be given later in the discussion of the data in Table XVI. The five-finger gloves were chosen because more numerous data were available concerning them than were available for the trigger-finger mittens.

The "incompatibility index" values for the communications activities were calculated as follows: The entries in Column 5 were weighted (1 for "bother," 2 for "hard," and 3 for "impossible"), and were summed for all of the steps in the activity. Their total was then divided by the sum of the "N"s for the corresponding steps. The resulting index values, based only on those instances where the QMC five-fingered gloves were used, are given in Table XIV.

In interpreting the list of activities in Table XIV, the problems previously discussed in this section should be kept in mind. Also, it should be emphasized that the "incompatibility index" technique is a very crude one which involved assumptions which may not always be true. As a result, position in the list should be thought of only as approximate, particularly when "index" values do not differ greatly.

Certain classes and items of QMC gear were involved in more incompatibilities than were others. Table XV shows that handgear items were involved in over four times as many incompatibilities as were all the other items combined (131 to 30). It also shows that more than three times as many equipment items as clothing items, excluding handgear, are involved in incompatibilities (23 to 7). However, the total number of incompatibilities in which an item is involved depends on the nature of the tasks, the frequency with which they are performed, the type of item, and on a variety of other

TABLE XIV: ACTIVITIES LISTED BY INCOMPATIBILITY INDEX*

ACTIVITY	WEIGHTED SUM OF INCOMPATIBILITIES/N	INCOMPATIBILITY INDEX	NUMBER OF STEPS WITH INCOMPATIBILITIES
SPLICING FIELD WIRE (TABLE VI)	29.5/ 20	1.5	(5)
INSTALLATION OF SB-22/PT (TABLE II)	33 / 23	1.4	(6)
INSTALL TERMINAL STRIP TM-184 (TABLE I)	12.5/ 11	1.1	(2)
POLE CLIMBING (TABLE X)	18 / 16	1.1	(6)
LAYING WIRE BY VEHICLE (TABLE IX)	5.5/ 5	1.1	(1)
INSTALL FIELD TELEPHONE, TA-312/PT (TABLE IV)	35.5/ 33	1.1	(7)
LAYING WIRE USING REEL EQUIPMENT, CE-11 (TABLE V)	14.5/ 17	0.8	(4)
RECOVERY OF WIRE WITH CE-11 REEL EQUIPMENT (TABLE VII)	4.5/ 6	0.8	(2)
INSTALLATION OF EMERGENCY SWITCHBOARD SB-18/GT (TABLE III)	12 / 18	0.7	(5)
OPERATE RADIO SET AN/PRC-6 (TABLE XI)	12.5/ 19	0.7	(4)
OPERATE RADIO SETS AN/PRC-9 & 10 (TABLE XII)	16 / 26	0.6	(4)
OPERATION OF RADIO SET, AN/VRC-18 (TABLE XIII)	2 / 15	0.1	(1)

*THIS APPROACH HAS THE DISADVANTAGE THAT IT DOES NOT TAKE INTO CONSIDERATION THE FACT THAT SOME ACTIVITIES HAVE MANY MORE STEPS THAN OTHERS. IF TWO ACTIVITIES HAVE ABOUT THE SAME INDEX, THE ONE WITH THE LARGER NUMBER OF STEPS WILL USUALLY BE INVOLVED IN MORE INCOMPATIBILITIES.

THE NATURE OF THE INCOMPATIBILITIES WHICH OCCURRED DURING "OVERHEADING WITH WIRE PIKE, MC-123" DID NOT FURNISH A SOUND BASIS FOR CALCULATING AN INDEX (TABLE VIII).

THERE WERE NO INCOMPATIBILITIES DIRECTLY RELATED TO THE OTHER THREE ACTIVITIES WHICH WERE STUDIED.

TABLE XV: FREQUENCY OF INCOMPATIBILITIES OF VARIOUS DEGREES OF SEVERITY*

CLASS OF ITEMS	DEGREE OF INCOMPATIBILITY			SUM
	"BOTHER"	"HARD"	"IMPOSSIBLE"	
HANDGEAR	50 (38%)	44 (33%)	38 (29%)	132 (100%)
OTHER CLOTHING	4	3	0	7
EQUIPMENT & WEAPONS	19	4	0	23
	23 (77%)	7 (23%)	0 (0%)	30 (100%)
SUM	73	51	38	162

CIRCUMSTANCES, IN ADDITION TO THE QUALITY OF ITEM DESIGN AND CONSTRUCTION. AS A RESULT, A WELL DESIGNED AND CONSTRUCTED ITEM OF ONE TYPE WHICH IS FREQUENTLY USED UNDER UNFAVORABLE CIRCUMSTANCES, MAY SOMETIMES BE INVOLVED IN AS MANY OR MORE INCOMPATIBILITIES THAN A LESS WELL DESIGNED ITEM OF A DIFFERENT TYPE WHICH IS USED LESS FREQUENTLY AND UNDER MORE FAVORABLE CIRCUMSTANCES.

TABLE XV ALSO SHOWS THAT THERE ARE PROPORTIONATELY LARGER NUMBERS OF SEVERE INCOMPATIBILITIES RELATED TO HANDGEAR THAN TO OTHER CLOTHING, OR TO EQUIPMENT AND WEAPONS. HOWEVER, THE 7 INCOMPATIBILITIES INVOLVING CLOTHING IS TOO SMALL A NUMBER TO PERMIT A RELIABLE COMPARISON IN TERMS OF SEVERITY OF INCOMPATIBILITY WITH HANDGEAR AND WITH EQUIPMENT AND WEAPONS. FOR THIS REASON, THE INCOMPATIBILITY DATA FOR "OTHER CLOTHING," AND FOR "EQUIPMENT AND WEAPONS" ARE COMBINED, RATHER THAN BEING TREATED SEPARATELY. TABLE XV SHOWS THAT 38% OF THE INCOMPATIBILITIES INVOLVING "HANDGEAR" WERE RATED AS "BOTHERSOME," 33% AS "HARD," AND 29% AS "IMPOSSIBLE." IN CONTRAST, THE FIGURES FOR "OTHER CLOTHING, EQUIPMENT, AND WEAPONS" WERE 77% "BOTHERSOME," 23% "HARD," AND 0% "IMPOSSIBLE." IT IS OBVIOUS THAT THE PROPORTION OF SEVERE INCOMPATIBILITY RATINGS IS MUCH HIGHER FOR HANDGEAR THAN FOR

*TABLES XV AND XVI ARE BASED ON DATA FROM TABLE I - XIII. HOWEVER, ONE CHANGE HAS BEEN MADE IN TOTALLING THE VALUES FOR ENTRY IN TABLES XV AND XVI. WHENEVER THE TWO OBSERVERS DISAGREED ON THE DEGREE OF INCOMPATIBILITY, INSTEAD OF ASSIGNING A VALUE OF 1/2 TO THE CATEGORY USED BY EACH OBSERVER, AS WAS DONE IN TABLES I - XIII, THE VALUES OF ONE WAS ASSIGNED RANDOMLY TO EITHER ONE CATEGORY OR THE OTHER. AS A RESULT, TABLES XV AND XVI DIFFER SLIGHTLY FROM THE SUM OF THE ENTRIES IN TABLES I TO XIII. THE FRACTIONS WERE ELIMINATED IN THIS WAY IN ORDER TO BETTER SATISFY THE ASSUMPTIONS UNDERLYING THE USE OF CHI SQUARE.

THE OTHER CATEGORY. WHEN THE CHI SQUARE TECHNIQUE WAS APPLIED TO THE DATA IN THIS TABLE, THE RESULT WAS A CHI SQUARE VALUE OF 17.7 WITH TWO DEGREES OF FREEDOM. THIS MEANS THAT THERE IS ONLY ONE CHANCE IN 1,000 THAT THE HYPOTHESIS THAT "HANDGEAR" AND THE OTHER CATEGORY DO NOT DIFFER WITH RESPECT TO DEGREE OF INCOMPATIBILITY, WOULD BE REJECTED ON THE BASIS OF CHANCE ALONE. IN OTHER WORDS, HANDGEAR DIFFERS SIGNIFICANTLY FROM "OTHER CLOTHING, EQUIPMENT, AND WEAPONS" WITH RESPECT TO THE FREQUENCY WITH WHICH VARIOUS DEGREES OF INCOMPATIBILITY ARE INVOLVED.

INCOMPATIBILITIES WERE OBSERVED IN RELATION TO THREE TYPES OF HANDGEAR: CIVILIAN GLOVES, STANDARD QMC FIVE-FINGER GLOVES WITH WOOL INSERTS (FIG. 4, 7), AND STANDARD QMC TRIGGER-FINGER MITTENS WITH WOOL INSERTS (FIG. 1, 2, 3, 5, 6, 8, 9 AND 10). CIVILIAN GLOVES WERE INVOLVED IN 10 (8%), QMC FIVE-FINGER GLOVES IN 93 (70%), AND QMC TRIGGER-FINGER MITTENS IN 29 (22%) OF THE 132 INCOMPATIBILITIES INVOLVING HANDGEAR. AGAIN, IT WOULD BE MISLEADING TO USE THE RELATIVE FREQUENCY WITH WHICH THE THREE TYPES OF HANDGEAR ARE INVOLVED IN INCOMPATIBILITIES AS A TRUE INDEX OF THEIR RELATIVE SUSCEPTIBILITY TO SUCH INVOLVEMENT, BECAUSE SOME TYPES WERE WORN FAR MORE FREQUENTLY THAN OTHERS AND THUS HAD MORE OPPORTUNITY TO BECOME INVOLVED IN INCOMPATIBILITIES.

CIVILIAN GLOVES WERE INVOLVED IN ONLY 10 OBSERVED INCOMPATIBILITIES, TOO FEW FOR RELIABLE STATISTICAL TREATMENT WHEN DISTRIBUTED OVER THREE DEGREES OF SEVERITY. AS A RESULT, FURTHER COMPARISONS OF THE RELATIVE SEVERITY OF HANDGEAR INCOMPATIBILITIES WERE LIMITED TO THE QMC FIVE-FINGER GLOVES AND THE TRIGGER-FINGER MITTENS. CALCULATIONS BASED ON THE DATA IN PART 1 OF TABLE XVI FOR THESE TWO TYPES OF HANDGEAR RESULTED IN A CHI SQUARE VALUE OF 15.5 WITH TWO DEGREES OF FREEDOM. (PART 1 IS BASED ON ALL THE INCOMPATIBILITY DATA FOR THESE TWO TYPES OF HANDWEAR.). THIS MEANS THAT THERE IS LESS THAN ONE CHANCE IN 1,000 THAT THE HYPOTHESIS, THAT RATINGS OF SEVERITY OF INCOMPATIBILITY ARE UNRELATED TO THE TYPE OF HANDGEAR, WOULD BE REJECTED ON THE BASIS OF CHANCE ALONE. CALCULATIONS BASED ON THE DATA IN PART 1 OF TABLE XVI ALSO SHOW THAT 17 OF 29 (59%) OF THE INCOMPATIBILITIES RELATED TO TRIGGER-FINGER MITTENS WERE RATED AS "IMPOSSIBLE" IN SEVERITY AND ONLY 19 OUT OF 93 (20%) OF THOSE INVOLVING THE FIVE-FINGER GLOVES WERE SO RATED.

IN ORDER TO INCREASE ACCURACY AND TO REDUCE POSSIBLE EFFECTS OF UNCONTROLLED CONDITIONS, THE PORTION OF THE HANDGEAR INCOMPATIBILITY DATA WHICH WAS BASED ON STEPS DURING WHICH BOTH TYPES OF GLOVES WERE WORN, WAS TABULATED AND THE DATA ARE GIVEN IN PART 2 OF TABLE XVI. IN PART II, THE VALUES AND PERCENTAGES WERE NEARLY THE SAME AS FOR PART I 17/29 (59%) "IMPOSSIBLE" FOR TRIGGER-FINGER MITTENS AND ONLY 13 OUT OF 73 (18%) "IMPOSSIBLE" FOR FIVE FINGER GLOVES. IN OTHER WORDS, TRIGGER-FINGER MITTENS ARE INVOLVED TO A STATISTICALLY SIGNIFICANT DEGREE IN A MUCH LARGER PROPORTION OF SEVERE INCOMPATIBILITIES THAN ARE FIVE-FINGER GLOVES.

TABLE XVI: SEVERITY OF INCOMPATIBILITIES FOR HANDGEAR

PART I TYPE OF HANDGEAR	DEGREE OF INCOMPATIBILITY			SUM
	"BOTHER"	"HARD"	"IMPOSSIBLE"	
QMC FIVE FINGER GLOVES	38	36	19	93
QMC TRIGGER-FINGER MITTENS	7	5	17	29
SUM	45	41	36	122
PART II				
QMC FIVE FINGER GLOVES	34	26	13	73
QMC TRIGGER-FINGER MITTENS	7	5	17	29
SUM	41	31	30	102

CALCULATIONS BASED ON PART II OF TABLE XVI RESULTED IN A CHI SQUARE TOTAL OF 16.8 WITH TWO DEGREES OF FREEDOM, WHICH IS SIGNIFICANT AT THE .001 LEVEL. THIS MEANS THAT THERE IS ONLY ONE CHANCE IN 1,000 THAT THE HYPOTHESIS, THAT RATINGS OF SEVERITY OF INCOMPATIBILITY IN PART II ARE UNRELATED TO TYPE OF HANDGEAR WOULD BE REJECTED ON THE BASIS OF CHANCE ALONE. CONCLUSIONS BASED ON PART II OF TABLE XVI ARE IN CLOSE AGREEMENT WITH THE CONCLUSIONS BASED ON PART I OF THE SAME TABLE.

THE DATA IN TABLE XVI AND THE DISCUSSION IN THE TWO PRECEDING PARAGRAPHS SUPPORT THE CONCLUSION THAT ANY ACTIVITY STUDIED WHEN THE TRIGGER-FINGER MITTENS WERE WORN WOULD TEND TO BE INVOLVED IN A HIGHER PROPORTION OF SEVERE INCOMPATIBILITIES THAN WOULD HAVE BEEN THE CASE IF THE FIVE-FINGER GLOVES WERE WORN. THESE FINDINGS GIVE FURTHER SUPPORT TO THE CONCLUSION STATED ON PAGE 20, THAT ONLY THE DATA FROM ONE TYPE OF HANDGEAR SHOULD BE USED FOR COMPUTING "INCOMPATIBILITY INDEX" VALUES SUCH AS ARE GIVEN IN TABLE XIV.

TRIGGER-FINGER MITTENS WERE INVOLVED IN A SOMEWHAT HIGHER PROPORTION OF INCOMPATIBILITIES THAN WERE FIVE-FINGER GLOVES. THE FIGURES ARE 29/45 (64%) TO 93/168 (55%) IN PART I OF TABLE XVI, AND 29/44 (66%) TO 73/139

(53%) IN PART II, WHEN THE PERCENTAGES ARE SECURED BY DIVIDING THE "SUM" BY "N."* HOWEVER, NEITHER OF THESE DIFFERENCES WAS SIGNIFICANT STATISTICALLY, I.E., THESE DIFFERENCES COULD HAVE OCCURRED BY CHANCE.

THE TECHNIQUE PREVIOUSLY USED TO CALCULATE THE MEAN WEIGHTED INCOMPATIBILITY INDEX VALUES IN TABLE XIV WAS USED TO CALCULATED SIMILAR INDEX VALUES FOR QMC HANDGEAR FROM THE DATA IN TABLE XVI. THE ENTRIES IN COLUMN 4 (TABLES I - XIII) WERE WEIGHTED (1 FOR "BOTHER," 2 FOR "HARD," AND 3 FOR "IMPOSSIBLE"), AND WERE SUMMED FOR ALL THE STEPS AND ACTIVITIES. THEIR TOTAL WAS THEN DIVIDED BY THE SUM OF THE "N"S FOR THE CORRESPONDING STEPS AND ACTIVITIES. THE RESULTING VALUES WERE MUCH HIGHER FOR THE MITTENS THAN FOR THE FIVE-FINGER GLOVES, 1.51 TO 0.99 FOR PART I AND 1.55 TO 0.90 FOR PART II, OF TABLE XVI. THESE RESULTS ARE IN CLOSE AGREEMENT WITH EACH OTHER AND WITH THE FINDINGS BASED ON OTHER TECHNIQUES.

THE STATISTICAL RESULTS BASED ON DIRECT OBSERVATIONS MADE IN THE FIELD AND SUMMARIZED IN TABLE XVI CONFIRM "COMMON SENSE" OPINIONS, THE OBSERVERS' IMPRESSIONS, COMMENTS BY COMMUNICATIONS PERSONNEL AND RESULTS OF LABORATORY EXPERIMENTS, ALL OF WHICH INDICATE THAT MEN CAN WORK BETTER WITH GLOVES THAN WITH TRIGGER-FINGER MITTENS.**

THERE WERE A NUMBER OF INCOMPATIBILITIES RELATED TO SPECIFIC CLOTHING ITEMS OTHER THAN GLOVES. A NUMBER OF MEN REPORTED INCOMPATIBILITIES INVOLVING BLACK RUBBER INSULATED COMBAT BOOTS (FIG. 5, 10). THEY SAID THAT IT WAS DIFFICULT TO RUN IN THE BOOTS BECAUSE THE BOOTS WERE HEAVY, THEY MADE THE FEET PERSPIRE, AND THE TOPS OF THE BOOTS CHAFED THE ANKLES.*** OBSERVATIONS ALSO INDICATED THAT, WHEN CLIMBING POLES OR TREES, IT WAS DANGEROUS TO WEAR "CLIMBERS" OVER THE INSULATED RUBBER COMBAT BOOTS BECAUSE THE "GIVE" (ELASTICITY) OF THE BOOT REDUCED THE WEARER'S CONTROL OVER THE "CLIMBERS," AND THUS CREATED A HAZARD. THE PILE CAP WAS INCOMPATIBLE WITH THE HELMET IN THAT IT DID NOT HOLD THE LATTER IN POSITION SATISFACTORILY. THE PILE CAP ALSO INTERFERED SLIGHTLY WITH SOME RECEIVER-TRANSMITTERS, AND EVEN MORE WITH CERTAIN HEADSETS (FIG. 4, 5, 7, 10).

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*"N" REFERS TO THE TOTAL NUMBER OF MEN WHO PERFORMED THE STEP IN WHICH AN INCOMPATIBILITY WAS SOMETIMES OBSERVED.

**IT SHOULD BE POINTED OUT THAT THE BULKIER AND WARMER TRIGGER-FINGER MITTENS MAY HAVE BEEN WORN MORE FREQUENTLY ON DAYS OF GREATER WINDCHILL THAN WERE THE FIVE-FINGER GLOVES. TO THE EXTENT THAT THIS IS TRUE, THE RELATION BETWEEN TYPE OF HANDGEAR AND SEVERITY OF INCOMPATIBILITY RATINGS MAY BE SOMEWHAT CONFOUNDED BY THE TENDENCY FOR MANUAL DEXTERITY TO BE REDUCED BY THE RELATIVELY LOW TEMPERATURE AND HIGH WINDCHILL WHICH PREVAILED WHEN TRIGGER-FINGER MITTENS WERE WORN.

***SEE FOOTNOTE TO TABLE IX.

THERE WERE A NUMBER OF INCOMPATIBILITIES INVOLVING THE HELMET AND HELMET LINER. THE LATTER EQUIPMENT INTERFERED SOMEWHAT WITH THE USE OF SOME RADIO AND TELEPHONE RECEIVERS. MOST OF THE MEN OBSERVED DID NOT FASTEN THE (HELMET) CHIN STRAP (FIG. 4, 5, 10). THIS WAS IN PART BECAUSE MANY MEN WITH COMBAT EXPERIENCE BELIEVE THAT FASTENING THE STRAP IS POTENTIALLY DANGEROUS IN THE EVENT OF BLAST OR CONCUSSION.* ALSO, SOME OF THE CHIN STRAPS OBSERVED DID NOT HAVE AUTOMATIC RELEASES AND SOME OF THE MEN WHO DID HAVE THESE RELEASES LACKED FAITH IN THEM AND SAID THEY WOULD NOT USE THEM IN COMBAT. IN ANY CASE, MOST CHIN STRAPS WERE UNFASTENED AND HELMETS FREQUENTLY FELL OFF WHEN MEN WERE OVERHEADING WIRE, AND LESS FREQUENTLY DURING OTHER ACTIVITIES.

THE TE-33 TOOL EQUIPMENT IS NOT COMPATIBLE WITH THE QMC CARTRIDGE BELT, IN THAT THE FORMER CANNOT BE ATTACHED TO THE LATTER, UNLESS MAKESHIFT MEANS OF ATTACHMENT IS USED, E.G., WIRE OR CORD (FIG. 5). FOR THIS REASON THE TOOL EQUIPMENT WAS OFTEN WORN AT A LESS CONVENIENT LOCATION SUCH AS ON THE TROUSER BELT WHEN A CARTRIDGE BELT WAS USED.

SEVERAL MEN INDICATED THAT THEY STRONGLY PREFERRED THE PACKBOARD TO THE STANDARD RADIO CARRYING EQUIPMENT FOR THE AN/PRC 9 OR 10 RADIO AND ASKED WHY THEY COULD NOT SECURE THE PACKBOARDS THROUGH LOCAL SUPPLY CHANNELS. THESE MEN CLAIMED THAT THE STRAPS OF THE STANDARD CARRYING PACK (FIG. 10) PULLED ON THE MUSCLES, THAT THE PACK WAS HARD TO DON AND DOFF, THAT IT BUNCHED UP, AND THAT IT MADE THE RADIO SEEM MUCH HEAVIER.

TABLE XII AND THE ACCOMPANYING SUMMARY SHOW THAT THE MOST FREQUENT INCOMPATIBILITY WITH THESE RADIOS WAS REMOVING THE ANTENNA BASE FROM THE ACCESSORY BAG WHILE WEARING HANDGEAR. USUALLY IT WAS NECESSARY TO TURN THE BAG, WHICH WAS ATTACHED TO THE RADIO, UP-SIDE-DOWN IN ORDER TO SECURE THE ANTENNA.

THE INTRENCHING TOOL (INCLUDING THE CARRIER) AND THE GAS MASK SOMETIMES GOT IN THE WAY OF OTHER EQUIPMENT, BUT THESE INCOMPATIBILITIES WERE USUALLY ONLY BOTHERSOME AND DID NOT SERIOUSLY INTERFERE WITH THE ACTIVITIES OBSERVED.

THE M-1 RIFLE OCCASIONALLY SLIPPED OFF THE SHOULDER WHEN WIRE WAS BEING "LAID" OR "OVERHEADED," OR BECAME CAUGHT ON RADIO CARRYING STRAPS. SEVERAL OF THE MEN CONSIDERED THIS WEAPON TOO LARGE AND TOO HEAVY FOR USE BY COMMUNICATIONS PERSONNEL, AND PREFERRED THE CARBINE.

THE TWO MEN OBSERVED USING THE STANDARD POLE CLIMBING GLOVES HAD DIFFICULTY IN SNAPPING THE SAFETY BELT INTO THE RINGS. THEY DID NOT LIKE

*THE MEN WERE INSTRUCTED TO WEAR THEIR HELMETS AS THEY WOULD WEAR THEM IN ACTUAL COMBAT.

THESE GLOVES AND STRONGLY PREFERRED STANDARD FIVE-FINGER GLOVES FOR CLIMBING. IT IS NOT KNOWN WHETHER SIMILAR RESULTS WOULD BE SECURED FROM A LARGER SAMPLE OF WIREMEN.

SCREWDRIVERS WERE NOT ISSUED TO OPERATORS OF THE AN/VRC-18 RADIO SETS, AND CONSEQUENTLY CERTAIN ADJUSTMENTS COULD NOT BE MADE UNTIL A SCREWDRIVER WAS SECURED.

IMPORTANT INCOMPATIBILITIES WERE RELATED TO SEVERAL SPECIFIC SIGNAL CORPS EQUIPMENT ITEMS. THE GROUND ROD USED IN CONNECTION WITH THE SB-22/PT TELEPHONE SWITCHBOARD WAS ONLY USED ON ONE OR TWO OCCASIONS. ALTHOUGH IT IS NOT COMPATIBLE WITH GLOVES, IT COULD BE MADE SO WITH RELATIVELY MINOR MODIFICATIONS. IT IS VERY DIFFICULT TO SPLICE FIELD WIRE IN THE COLD WHEN WEARING GLOVES AND EVEN MORE DIFFICULT WITH TRIGGER-FINGER MITTENS (FIG. 6). IN PART, THE DIFFICULTY IS DUE TO THE INCREASED STIFFNESS OF THE WIRE AND INSULATION AT LOW TEMPERATURES. THE DIFFICULTY IS ALSO PARTLY A RESULT OF DECREASED MANUAL DEXTERITY AND INCREASED STIFFNESS OF THE GLOVES IN THE COLD. WRAPPING INSULATION TAPE AROUND THE SPLICE IS A PROBLEM DUE TO THE LACK OF TRANSFER OF HEAT FROM THE HANDS (THROUGH THE GLOVES) TO THE TAPE. THIS HEAT IS NECESSARY FOR THE INSULATION TAPE TO "STICK" PROPERLY.

IT IS IMPOSSIBLE TO OPEN THE SCREWDRIVER BLADE (OR ANY OTHER BLADE) OF THE KNIFE OF THE TE-33 TOOL EQUIPMENT WITH GLOVED HANDS. IT IS NECESSARY TO USE EITHER A THUMB OR FINGERNAIL, OR A TOOL, E.G. THE POINT OF A BAYONET OR WIREMAN'S PLIERS.

IN USING THE EMERGENCY SWITCHBOARD (SB-18/GT), IT WAS DIFFICULT TO REMOVE THE ADAPTER PLUGS FROM THE CASE AND TO TIGHTEN THE ADAPTER PLUG TERMINALS, WHEN WEARING HANDGEAR (FIG. 2).

THE GENERATOR HANDLE OF THE TA-312/PT TELEPHONE SET IS VERY DIFFICULT TO LIFT INTO POSITION FOR CRANKING, WHEN GLOVES OR MITTENS ARE WORN (FIG. 3).

5. SUMMARY

NUMEROUS MINOR, A FAIR NUMBER OF MODERATE AND SOME SERIOUS INCOMPATIBILITIES HAVE BEEN POINTED OUT IN CONNECTION WITH 13 OF THE 16 COMMUNICATIONS ACTIVITIES STUDIED. LARGE DIFFERENCES WERE FOUND TO EXIST BETWEEN THE COMMUNICATIONS ACTIVITIES WITH RESPECT TO FREQUENCY OF OCCURRENCE AND SEVERITY OF INCOMPATIBILITIES. THESE ACTIVITIES HAVE BEEN ARRANGED IN APPROXIMATE ORDER WITH RESPECT TO THE INVOLVEMENT IN INCOMPATIBILITIES. THE MORE IMPORTANT INCOMPATIBILITIES HAVE BEEN DISCUSSED IN RELATION TO THE QMC CLOTHED MAN, HIS HANDGEAR, HIS PERSONAL EQUIPMENT, HIS OTHER EQUIPMENT, AND THE COMMUNICATION ACTIVITIES WHICH HE PERFORMED.

HANDGEAR ITEMS WERE FOUND IN APPROXIMATELY FOUR TIMES AS MANY INCOMPATIBILITIES AS WERE ALL OTHER TYPES OF ITEMS COMBINED, AND APPROXIMATELY THREE TIMES AS MANY CLOTHING ITEMS, NOT INCLUDING HANDGEAR, WERE INVOLVED

IN INCOMPATIBILITIES AS COMPARED TO EQUIPMENT ITEMS. IN ADDITION, HANDGEAR WAS INVOLVED IN A MUCH HIGHER PROPORTION OF SEVERE INCOMPATIBILITIES THAN WERE CLOTHING, EQUIPMENT, AND WEAPONS. TRIGGER-FINGER MITTENS WERE INVOLVED IN A HIGHER PROPORTION OF SEVERE INCOMPATIBILITIES THAN WERE GLOVES. THERE WERE ALSO A FEW INCOMPATIBILITIES INVOLVING MISCELLANEOUS QUARTERMASTER CORPS, SIGNAL CORPS, ORDNANCE CORPS, AND OTHER ITEMS.

ON THE BASIS OF THE OBSERVATIONS MADE, IT IS BELIEVED THAT THE FOLLOWING ARE A FEW OF THE MANY SUBJECTS WHICH DESERVE FURTHER STUDY:

(1) THE STABILITY OF THE HELMET AND HELMET LINER, PARTICULARLY AS AFFECTED BY THE PILE CAP.

(2) ACCESSABILITY OF RADIO ANTENNAE WHEN STOWED.

(3) THE RELATIVE EFFICIENCY AND COMFORT OF THE CARRYING PACK FOR THE AN/PRC-9 AND 10 RADIOS AS COMPARED WITH CARRYING THE SAME RADIOS ON A PACKBOARD.

(4) TOOL REQUIREMENTS FOR OPERATORS OF VARIOUS TYPES OF RADIOS.

(5) THE COMPATIBILITY OF ALL TYPES OF QMC HANDGEAR WITH ALL TYPES OF ARMY EQUIPMENT WHICH ARE USED UNDER CRITICAL CONDITIONS.

6. CONCLUSIONS

1. A FEW SERIOUS, SOME MODERATE, AND NUMEROUS MINOR INCOMPATIBILITIES EXIST IN CONNECTION WITH THE COMMUNICATIONS ACTIVITIES STUDIED.

2. THE COMMUNICATIONS ACTIVITIES CAN BE RANKED APPROXIMATELY WITH RESPECT TO THE COMBINED FREQUENCY AND SEVERITY OF THE INCOMPATIBILITIES OBSERVED DURING EACH ACTIVITY.

3. HANDGEAR ITEMS WERE INVOLVED IN A LARGER NUMBER AND MORE SERIOUS INCOMPATIBILITIES THAN WERE OTHER QMC CLOTHING AND EQUIPMENT ITEMS OR NON-QMC EQUIPMENT ITEMS.

4. TRIGGER-FINGER MITTENS WERE OBSERVED IN A HIGHER PROPORTION AND IN MORE SEVERE INCOMPATIBILITIES THAN WERE FIVE-FINGER GLOVES.

7. RECOMMENDATIONS

1. WHENEVER QMC ITEMS OF HANDWEAR, CLOTHING, AND EQUIPMENT ARE INVOLVED IN SERIOUS INCOMPATIBILITIES OF PRACTICAL IMPORTANCE, NECESSARY ACTION SHOULD BE TAKEN TO DETERMINE WHETHER THE ITEMS CONCERNED REQUIRE MODIFICATION, REDESIGN, OR REPLACEMENT.

2. Necessary action should be taken to initiate cooperative efforts between the Quartermaster Corps and the Signal Corps in order to (1) eliminate incompatibilities known to exist at present, which require joint QMC-Signal Corps action, and (2) to prevent future incompatibilities.

8. References

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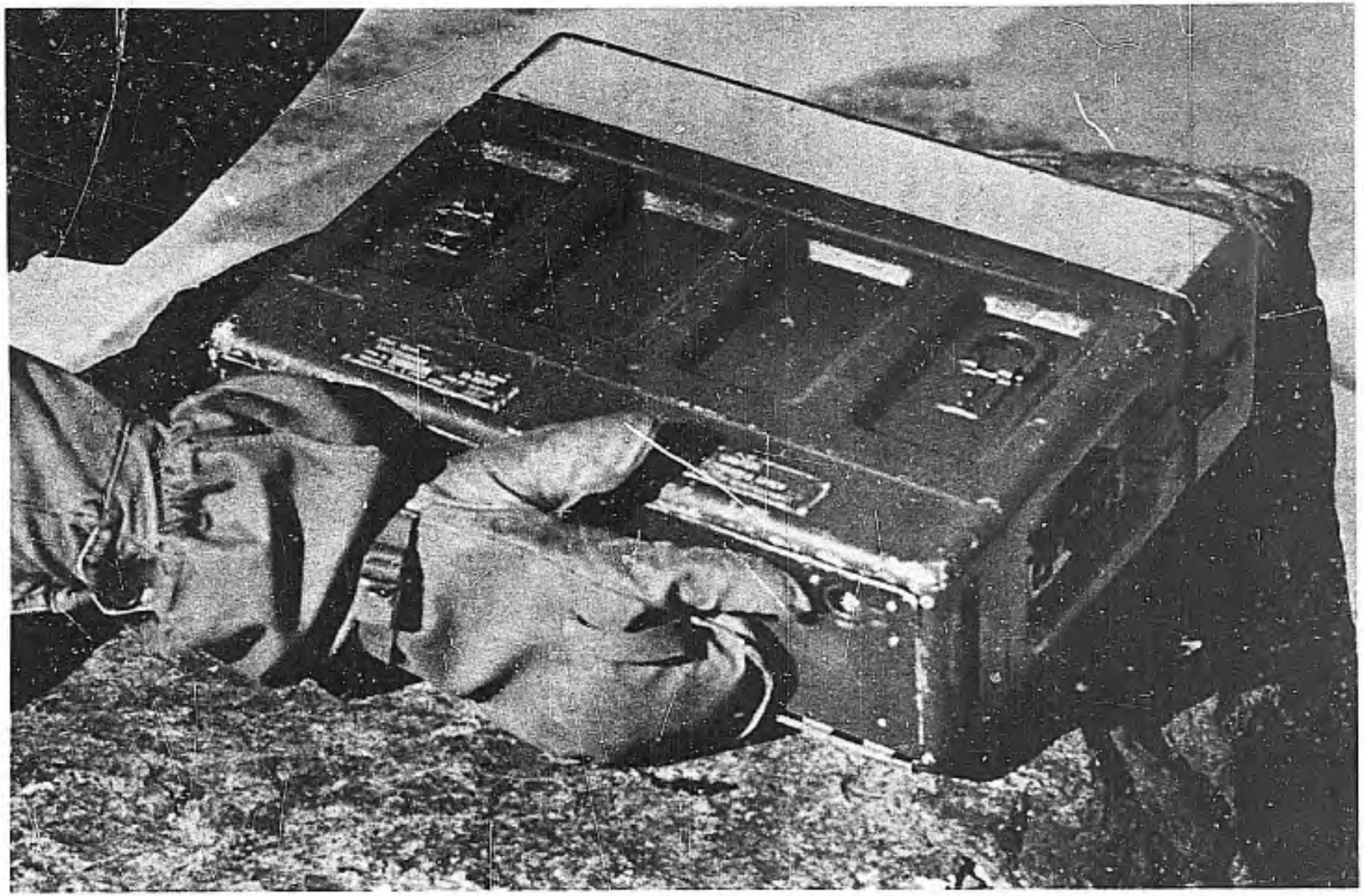

FIGURE 1: LATCH ON SWITCHBOARD, TELEPHONE, MANUAL, SB-22/PT IS TOO SMALL FOR OPERATION BY GLOVED HAND.

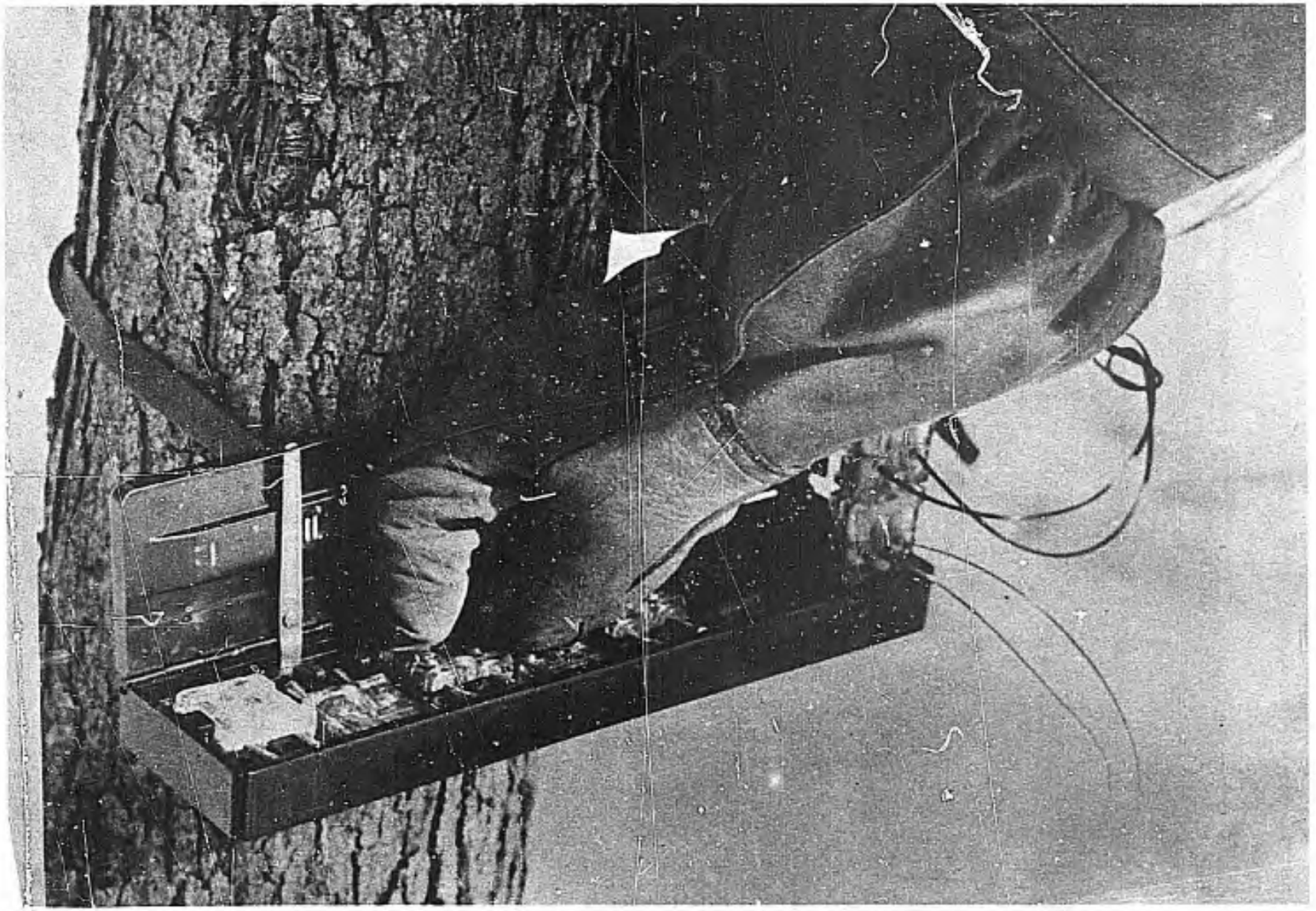

FIGURE 2: IT IS DIFFICULT TO GRASP EMERGENCY SWITCHBOARD PLUGS WHILE WEARING TRIGGER-FINGER MITTENS.

FIGURE 3: IT IS DIFFICULT TO GRASP GENERATOR HANDLE ON TA-312/PT TELEPHONE SET WHILE WEARING TRIGGER-FINGER MITTENS.

FIGURE 4: PILE CAP INTERFERES SOMEWHAT WITH LISTENING OVER TA-312/PT TELEPHONE SET.

FIGURE 5: LAYING WIRE USING REEL EQUIPMENT, CE-11, WHILE COMBAT EQUIPPED.

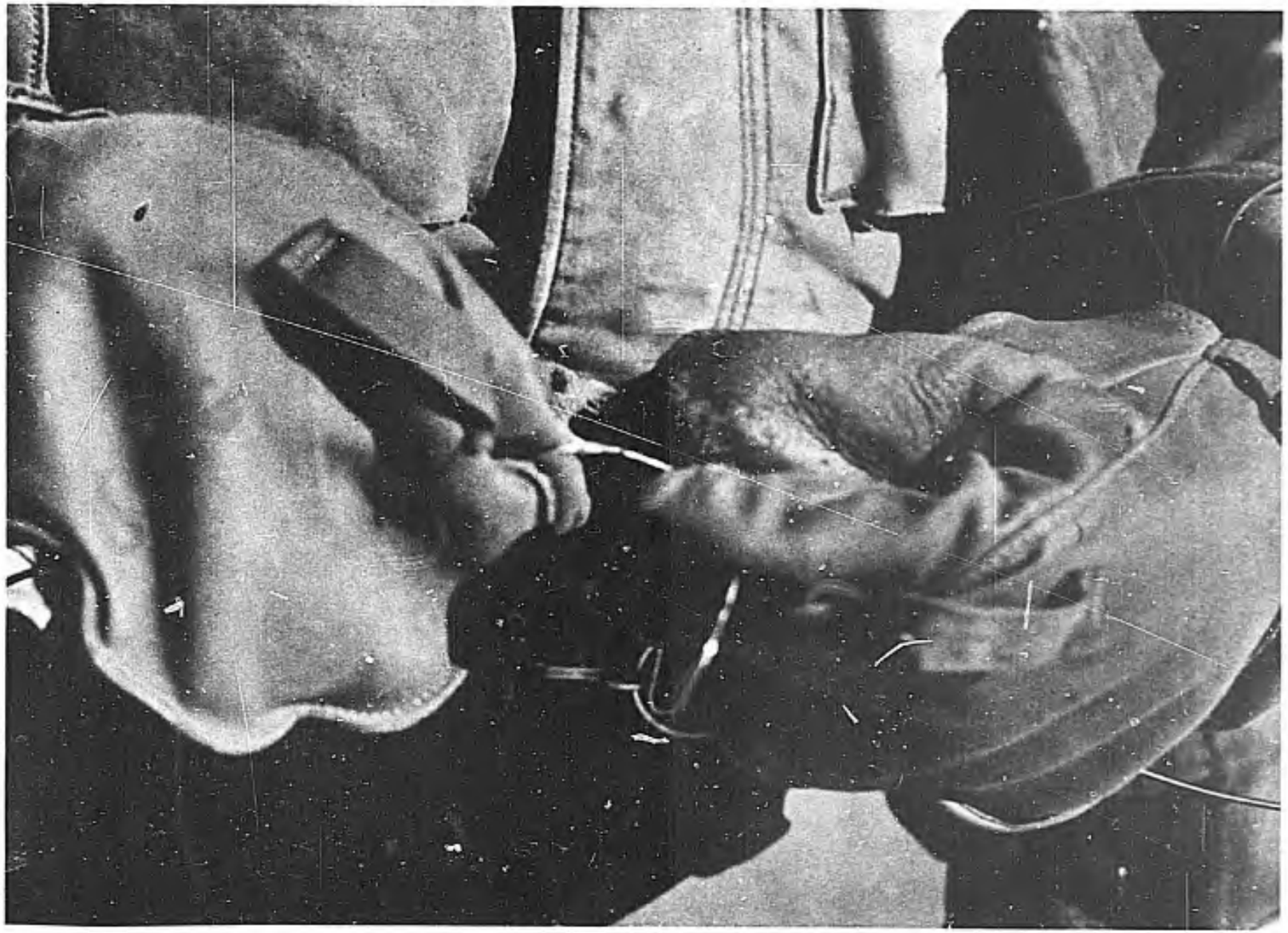

FIGURE 6: TYING SQUARE KNOT WHEN SPLICING FIELD WIRE (WHILE WEARING TRIGGER-FINGER MITTENS).

FIGURE 7: RECOVERY OF WIRE WITH REEL EQUIPMENT, CE-11.

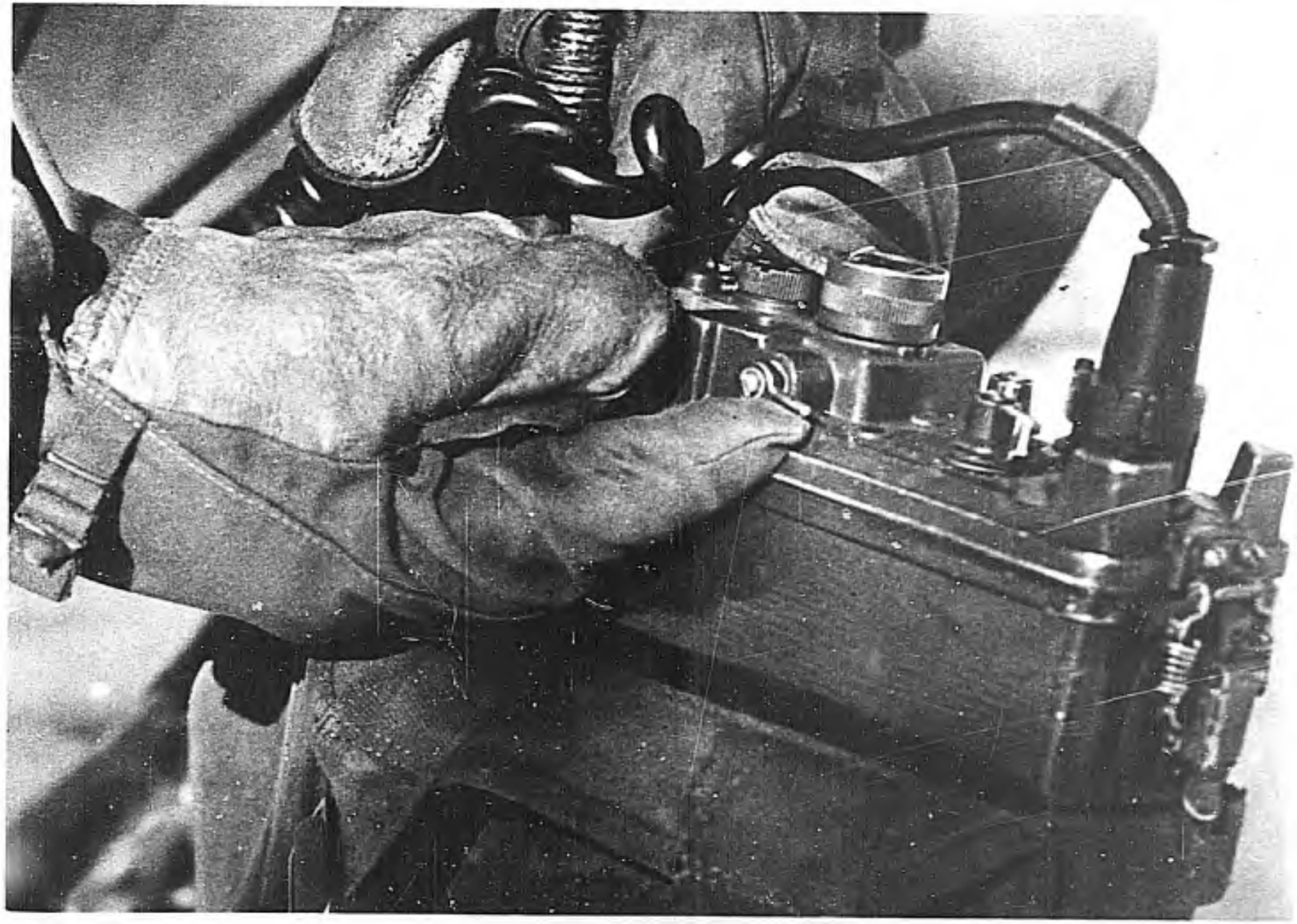

FIGURE 8: UNLOCKING TUNING KNOB ON AN/PRC-10 RADIO WHILE WEARING TRIGGER-FINGER MITTENS.

FIGURE 9: ADJUSTING POINTER ON AN/PRC-10 RADIO WHILE WEARING TRIGGER-FINGER MITTENS.

FIGURE 10: COMBAT-EQUIPPED AN/PRC-10 RADIO OPERATOR

APPENDIX A

WEATHER DATA
(TIME IN PARENTHESES)

FEB. 1959:	2	4	6	9	11	13	16	18	19	20
ORGANIZATION	HQ CO.	HQ CO.	MORTAR BTRY	MORTAR BTRY	MORTAR BTRY	MORTAR BTRY	A CO.	B CO.	C CO.	D CO.
TEMPERATURE (°F.)	27° (1500)	48° (0637)	29° (0700) 25° (1600)	15° (1230)	31° (0630) 25° (1200) 23° (1600)	33° (0700) 43° (1200) 46° (1600)	20° (0700) 30° (1200) 36° (1600) 38°*(1545)	32° (0700) 36° (1300) 35°*(0930) 34°*(1155) 33°*(1330) 33°*(1440)	20° (0700) 22° (1200) 20°*(0930) 22°*(1105) 22°*(1345) 23°*(1435)	2° (0700) -1° (1200) 9°*(0940) 12°*(1145) 11°*(1305) 14°*(1530)
WIND SPEED (MPH)	10-15 (1500)	20-30 (0637)	12 (0700) 16-GUSTING TO 42 (1600)	--	12 (0630) 7 (1200) 24-30(1600)	18-30 (0700) 12-24 (1200) 14(1600)	24 (0700) 24 (1200) 1*(1545)	12-18(0700) 10(1300) 3*(0930) 3*(1155) 1*(1330) 2*(1440)	15(0700) 12-36(1200) 6-7*(0930) 9*(1105) 12*(1345) 7-8*(1435)	17-19(0700) 18(1200) 9-10*(0940) 8*(1145) 7*(1305) 7*(1530)
WIND** CHILL FACTOR	1031 (1500)	780 (0637)	1120 (0700) 1100-1300 (1600)	700 (1230)	900 (0630) 920 (1200) 1210-90(1600)	1010-1110 (0700) 730-860 (1200) 750(1600)	1290(0700) 1100(1200) 500*(1545)	710(0700) 850(1300) 650*(0930) 665*(1155) 620*(1330) 615*(1440)	1180(0700) 1090-1330 (1200) 978*(0930) 1022*(1105) 1092*(1345) 974*(1435)	1510-1550(0700) 1575(1200) 1229*(0940) 1139*(1145) 1137*(1305) 1093*(1530)
PRECIPITATION	NONE	NONE	NONE	NONE	SNOW	RAIN 'TIL MID-MORNING	NONE	SNOW & RAIN MIXED	NONE	NONE
SURFACE COND.	SNOW & ICE	SLUSH, MUD, SNOW	SNOW & ICE	SNOW & ICE	SNOW & ICE	SNOW, ICE & WATER	SNOW & ICE	SNOW, SLUSH, WATER, ICE	SNOW CRUST, BARE GROUND, LEAVES	SNOW & ICE

*LOCAL DATA

**KG CAL/M²/HR

APPENDIX B

1. QMC Clothing Items Worn by Communications Personnel

LABEL DESCRIPTION OR COMMON DESIGNATION	FEDERAL STOCK NUMBER AND NOMENCLATURE	
Undershirt, Cotton	8420-176-*	Undershirt, Man's, cotton, quarter length sleeves, white.
Drawers, Cotton	8420-221-	Drawers, Man's, thigh length, cotton, white.
Undershirt, Winter, M-1950	8420-197-	Undershirt, Man's, 50% cotton, 50% wool, full length sleeve, natural.
Drawers, Winter, M-1950	8420-269-	Drawers, Man's, ankle length, 50% cotton, 50% wool, ribbed knit, unbleached.
Jacket, Cotton, OG-107** (Jacket, Utility)	8405-266-	Jackets, Man's, cotton sateen, olive green, shade no. 107.
Trousers, Cotton, OG-107** (Trousers, Utility)	8405-222-	Trousers, Men's, cotton sateen, 8.5 oz., olive green, shade no. 107.
Shirt, Field, Wool, OG-108	8405-188-	Shirt, Man's, wool, 16 oz, olive green, shade no. 108.
Trouser, Shell, Field, M-1951	8405-265-	Trousers, Men's, cotton, wind resistant, sateen, 9 oz, olive green, shade no. 107, water repellent treated.

*Only 7 of the 11 digits of the Federal Stock Numbers are given for clothing items. The remaining digits refer to the size of the item.

**More than one type of utility jacket and trousers were worn, i.e., these items are made out of various materials.

LABEL DESCRIPTION OR COMMON DESIGNATION	FEDERAL STOCK NUMBER AND NOMENCLATURE	
SUSPENDERS, TROUSERS, M-1950	8440-221-	SUSPENDERS, TROUSERS, SCISSOR-TYPE BACK, OLIVE GREEN, SHADE NO. 107.
JACKET, SHELL, FIELD, M-1951	8405-255-	COAT, MAN'S, COTTON, WIND RESISTANT, SATEEN, WATER REPELLENT TREATED, OLIVE GREEN, SHADE NO. 107, SLIDE FASTENER CLOSURE.
LINER, JACKET, FIELD, M-1951	8405-261-	LINER, COAT, MAN'S, MOHAIR FRIEZE, 16 OZ WT.
PONCHO, LIGHTWEIGHT W/HOOD	8405-290-	PONCHO, COATED NYLON, OLIVE GREEN, SHADE NO. 207.
CAP, FIELD, PILE, M-1951	8405-268-	CAP, FIELD, COTTON POPLIN, WOOL PILE LINING, OLIVE GREEN, SHADE NO. 107.
SOCKS, WOOL, CUSHION SOLE, O.D.	8440-531-	SOCKS, MEN'S, WOOL, OLIVE GREEN, SHADE NO. 108, W/CUSHION SOLE, 15 IN. LEG LENGTH.
BOOTS, COMBAT, MAN'S	8430-270-	BOOT, COMBAT, MAN'S, LEATHER, BLACK, CAPPED TOE, RUBBER SOLE AND HEEL, MILDEW RESISTANT.
BOOTS, INSULATED, COLD WEATHER, RUBBER	8430-236-	BOOT, INSULATED, COLD WEATHER, MAN'S, RUBBER, BLACK, PLAIN TOE, RUBBER CHEVRON CLEATED SOLE AND HEEL.
OVERSHOES	8430-144-	OVERSHOE, RUBBER, MAN'S, HIGH, BLACK, CLEATED RUBBER OUTSOLE AND HEEL, FIVE BUCKLES.
GLOVE SHELLS, LEATHER	8415-269-	GLOVE SHELLS, LEATHER, WITH COTTON WEBBING BUCKLE WRIST STRAP, WATER RESISTANT, 5 FINGER SHEATHS, GUNN CUT, BLACK FOR USE WITH GLOVE INSERTS IN COLD WEATHER FOR LIGHT WORK.
GLOVE INSERTS, WOOL	8415-160-	GLOVE INSERTS, WOOL, KNIT, KNIT CUFFS, 5 FINGER SHEATHS, OLIVE DRAB.

LABEL DESCRIPTION OR COMMON DESIGNATION	FEDERAL STOCK NUMBER AND NOMENCLATURE	
MITTEN SHELLS, TRIGGER-FINGER, M-1948	3415-199-	MITTEN SHELLS, WIND RESISTANT COTTON SATEEN, LEATHER PALM AND THUMB, WATER REPELLANT, GAUNTLET WITH WRIST STRAP, 3-FINGER SHEATHS, OLIVE GREEN 107.
MITTEN, INSERTS, TRIGGER-FINGER, M-1948	8440-160-	MITTEN, INSERTS, WOOL AND NYLON KNIT, TRIGGER-FINGER, OD.

2. QMC EQUIPMENT WORN OR CARRIED BY COMMUNICATIONS PERSONNEL

BELT, CARTRIDGE, CAL. 30, DISMOUNTED	8465-162-	BELT, CARTRIDGE, DISMOUNTED, COTTON WEBBING, OLIVE DRAB, QM SHADE 7, MILDEW RESISTANT AND WATER REPELLENT TREATED, BRONZE FINISH BRASS HOOK BUCKLE FASTENER.
BELT, PISTOL	8465-162-	BELT, PISTOL, COTTON WEBBING, OLIVE DRAB, QM SHADE 7, MILDEW RESISTANT AND WATER REPELLANT TREATED, BRONZE FINISH, BRONZE HOOK BUCKLE FASTENER.
CANTEEN, ALUMINUM	8465-191-0366	CANTEEN, WATER, ALUMINUM, 950 CUBIC CENTIMETERS CAPACITY, WITHOUT CANTEEN CUP AND COVER.
COVER, CANTEEN, DISMOUNTED	8465-379-2602	COVER, WATER CANTEEN, BODY OF COTTON DUCK AND WEBBING BINDING, OLIVE DRAB, QM SHADE NO. 7, MILDEW RESISTANT AND WATER REPELLANT TREATED, WOOL FELT LINED, SNAP FASTENER CLOSURE, WITH DOUBLE HOOKS FOR ATTACHING TO BELT.
CUP, CANTEEN	8465-242-7844	CUP, CANTEEN, ALUMINUM, 5 IN. LONG, 3 IN. WIDE, 4 IN. DEEP, WITH FOLDING HANDLE.
HELMET, STEEL W/DETACHABLE STRAP	8415-161-9411	HELMET, SOLDIER'S, STEEL, OLIVE DRAB, WITH RELEASE CHIN STRAP, WITHOUT PARACHUTIST TYPE CHIN GUARD, 2 LB, 1-5/8 OZ MAX WT, MODEL M-1.

LABEL DESCRIPTION OR COMMON DESIGNATION	FEDERAL STOCK NUMBER AND NOMENCLATURE	
HELMET, LINER	8415-240-2512	LINER, SOLDIER'S STEEL HELMET, PHENOLIC RESIN IMPREGNATED COTTON SHEETING AND/OR DRILL SHELL, OLIVE DRAB, QM SHADE 319. WEIGHT, OUNCES - 10 (COMPLETE WITH CHIN STRAP).
PACK, FIELD, COMBAT	8465-266-9918	FIELD PACK, CANVAS, 14.35 OZ PER SQ YD FABRIC, OLIVE DRAB QM SHADE 7, MILDEW RESISTANT AND WATER REPELLENT TREATED, FLAP CLOSURE WITH BUCKLE STRAPS, M-1945. DESIGNED FOR USE - COMBAT.
SUSPENDERS, PACK, FIELD, COMBAT	8465-163-9539	SUSPENDERS, FIELD, PACK, DIAMOND BACK TYPE, COTTON WEBBING, OLIVE DRAB, QM SHADE 7, ADJUSTABLE 26 IN. TO 43 IN. LONG, 2 IN. WIDE.
CASE, FIELD FIRST AID	8465-261-4999	CASE, FIELD FIRST AID DRESSING - UNMOUNTED MAGNETIC COMPASS, COTTON WEBBING, OLIVE DRAB, WITH LEGEND "US" M-1942, LENGTH, INCHES 5-5/8, WIDTH, INCHES, 4-1/4.
INTRENCHING TOOL, COMBINATION	5120-289-0540	INTRENCHING TOOL, HAND, COMBINATION.
CARRIER, INTRENCHING TOOL, COMBINATION	5140-261-4993	CARRIER, INTRENCHING TOOL, FOR HINGED STYLE SHOVEL, COTTON DUCK CLOTH, OLIVE DRAB.
GLOVE, LINEMAN'S	8415-268-7877	GLOVES, LEATHER, WORK TYPE, MEN'S, GAUNTLET CUFF, PULL TAB, LINEMAN'S TYPE, NATURAL, LARGE, FED KK-G-476.

3. SIGNAL CORPS EQUIPMENT USED

TELEPHONE SET, TA-312/PT

TELEPHONE, TA-1/TT

LABEL DESCRIPTION OR COMMON DESIGNATION	FEDERAL STOCK NUMBER AND NOMENCLATURE	
TERMINAL STRIP, TM-184		
REEL EQUIPMENT, CE-11		
REEL, RL-39		
SPOOL, DR-8-A		
WIRE WD-1/TT		
EMERGENCY SWITCHBOARD, SB-18/GT		
SWITCHBOARD, TELEPHONE, MANUAL, SB-22/PT		
RADIO SET, AN/PRC-6		
RADIO SET, AN/PRC-9		
RADIO SET, AN/PRC-10		
RADIO SET, AN/VRC-18		
WIRE PIKE, MC-123		
CLIMBERS, LC-240/U		
REEL, RL-159/U		
REEL UNIT, RL-31		
TOOL EQUIPMENT, TE-33		

4. OTHER EQUIPMENT CARRIED BY COMMUNICATIONS PERSONNEL

BELT, LINEMAN'S SAFETY	4240-203-3803	BELT, SAFETY, INDUSTRIAL-LINEMAN'S SAFETY TOOL BELT.
RIFLE, US CAL. .30	1005-674-1425	RIFLE, CAL. .30, M-1.

LABEL DESCRIPTION OR COMMON DESIGNATION	FEDERAL STOCK NUMBER AND NOMENCLATURE	
CARBINE CAL. .30	1005-670-7670	CARBINE, CAL. .30, M-1.
BAYONET KNIFE W/SCABBARD, RIFLE	1005-317-2459	BAYONET, M1, W/SCABBARD, M7.
MASK, PROTECTIVE, FIELD	4240-368-	MASK, PROTECTIVE, FIELD, M9A1.
PACKET, FIRST AID	6510-201-7455	DRESSING, FIRST-AID FIELD, INDIVIDUAL TROOP, 4 BY 7 INCHES: STERILE; BRGWN; (FIRST AID PACKET).

ACTIVITY: Appendix C - Recording Form* DATE: P ___

POSTURE	LOCOMOTION	SENSORY	STEP (and Keypoints)	IMP	MOVEMENTS							INC	REMARKS
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	1)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hrc	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	2)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	3)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	4)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	5)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	6)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	7)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	8)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	9)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	10)	1c	per	rot	I	wri	FRo	ft	car	1b	* Reduced from 8 by 13 in
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			
1 upr 5 sqt	1 sta 4 crl	1 VTP 4 Vfd 7 fSd	11)	1c	per	rot	I	wri	FRo	ft	car	1b	
2 bnd 6 kne	2 wlk 5 jmp	2 dVi 5 tch 8 sph		3r	pGr	pul	T	elb	Hro	ank	lft	2h	
3 cro 7 pro	3 run 6 clb	3 nVi 6 T&S 9 bHd	T - - - - - - - - - - - - - - -	5u	grp	psh	Fs	shd	trk	kne	thr	3I	
4 sit 8 sup		10 PLS	K:					HNf		hip			

DATE:
ACTIVITY:

ANALYSIS SHEET: MILITARY ACTIVITIES AND EQUIPMENT INCOMPATIBILITIES

ORGANIZATION:

STAGE OF TRAINING:

LOCATION:
Lat: Long: Alt: Ft.

RANK	NAME	AGE	HT"	WT	MO in A	B.STR	H.G.C.	JOB TITLE	JOB TR	Ind. Dev. from Basic Uniform
1										
2										

Hour ____ DB ____ °F Ba
WB ____ °F RH ____ % Br ____
Wind
Wind ____ mph. Dir. ____
Wind Shifts ____
Men Facing ____ Sky Cov ____ %
Ter-rain ____
Surf. Cond. ____

01 Jacket	21 Fld jacket	41 Parka	61 Raincoat	SUNRY	
	22 Fld jack.lnr	42 Parka lnr	62 Poncho	Q%c	
	23 OG shirt	43" over-wh	63 Wet-W.parka	Q%e	
02 Trouser	24 Fld trousers	44 Arctic trou	64 Wet-w trous	Oth.e	
	25 Fld trou.lnr	45 Arc.tr.lnr.	80 Suspenders	Act	
	26 OG trousers	46 Over-wh. tr	81 Belt, cart	Postur ____ Locmtn ____	
03 T shirt	27 Undsht.wint.		82 Belt, pistol	Motion ____	Breath
04 Cot.shts	28 Drawers,wint		83 Pouch, F. Aid		T bal
05 Cap, fat	29 Cap,fld,cot.		84 Canteen	Sensry ____	W bal
06 Lnr, hel	30 Cap, pile		85 Bayonet	Degree Degree	Eat
07 Helmet	31 Hood,fld jac	47 Hood,parka	86 Shov.intr.w/c	Incomp Import	U D
08 Glove,5	32 Mitten 3,shl	48 Mit,Arc.Shl	87 Goggles		
	33 Insert 3	49 Mit,Arc.ins	88 S. Glass. w/c		
09 Insert,5	34 Overshoes	50 Mit.A.ov-wh	89 Sus.pk.fld.C		
10 Boot,C.L	35 Boots, R.ins	51 Boots,Arc.R	90 Pack combat		
11 Sox, c.s.	36 Sox, cush. s	52 Mukluk,w/ac	91 Pack, cargo		

WPNS,TLS,OTH.E

SUNRY
Q%c ____
Q%e ____
Oth.e ____
Act ____
Postur ____ Locmtn ____
Motion ____ Breath
T bal
Sensry ____ W bal
Degree Degree Eat
Incomp Import U D

SUNRY
Q%c ____
Q%e ____
Oth.e ____
Act ____
Postur ____ Locmtn ____
Motion ____ Breath
T bal
Sensry ____ W bal
Degree Degree Eat
Incomp Import U D