COAST GUARD LANDLINE COMMUNICATIONS 1873 THROUGH 1974

CPO R. W. Eckel
CWO R. Snow

Telephone and Teletype Section
Electronics Engineering Division
U.S. Coast Guard Headquarters

The following article is presented in two parts. Part I traces the early development of the Coast Guard Telephone and Telegraph communications and the development of the Telephone Technician rate up to the present time. Part II traces the development of maintenance vehicles, submarine cable, and teletype.

PART I

EARLY COAST GUARD TELEPHONE AND TELEGRAPH LINES

The origin of Coast Guard Landline Communications can be traced back to 1873, when the Army Signal Corps first installed communications circuits between a few lifesaving stations. Although these consisted only of telegraph lines, they proved so successful that all lifesaving stations became so equipped. These lines formed what was called the "Storm-Signal Service."

Just five years later, the Army Signal Corps connected the 12 lifesaving stations dotting the beaches between Cape Henry, Va. and Kitty Hawk, N.C. with the first telephone and telegraph line. This was the first time that the telephone was utilized deliberately as a tool for the saving of life and property in America.

The dramatic success of these early telegraph and telephone lines in lifesaving work prompted the Army Signal Corps to greatly extend this unique service. Soon, similar lines connected the 19 lifesaving stations between Cape Henlopen, Del. and Cape Charles, Va. and the 14 stations along the North Carolina Coast, as well as several lifesaving stations on the Great Lakes.

In early 1890, when the U.S. Weather Bureau was formed, it took over the old Army Signal Corps weather and storm warning network together with the telephone service that connected these lifesaving stations. During this period of time, the Army Signal Corps lines were known as the "Sea-Coast Telegraph and Telephone Line." In the latter part of 1890, the lifesaving service took over the responsibility of most of the landline communications systems that were formerly handled by the Army Signal Corps and the Weather Bureau.

Not until 1916, after the U.S. Coast Guard was formed by the merger of the U.S. Lifesaving Service and the U.S. Revenue Cutter Service, did the communications network change to any great extent. Thus, an executive order gave the necessary authority to connect all Coast Guard stations together and to up-date the system to the best quality possible. By 1918, Coast Guard personnel had completed the majority of the work involved with the construction of these lines.

Sometime in either 1916 or 1917, the U.S. Coast Guard and the American Telephone and Telegraph (AT&T) Company signed an agreement to interface the Service's equipment with existing AT&T equipment. To accomplish this goal, the telephone companies that were affiliates of the Bell System were allowed to sell or rent their equipment to the Coast Guard, thus insuring their compatability with AT&T equipment. For 51 years this agreement remained in force with only minor changes, and most of these only had to do with interpretation of a specific statement or two. Although this agreement was terminated in 1968, the Telephone Companies and Coast Guard still work in much the same manner as they did when the agreement was first put into effect.

THE ORIGINAL COAST GUARD TELEPHONE MEN

In 1888, the Coast Guard hired a civilian named William Bolton to head its communications network. The standard procedure in the early days was for the Coast Guard personnel assigned to the various stations to maintain the landlines connecting them, while Mr. Bolton and his two assistants followed up with permanent repairs. Mr. Bolton's title at that time was "Expert Telephone Lineman" and his salary was $100 per month. In 1890, his job title changed to "Superintendent of Telephone Lines" and his salary increased to $115 per month.

Between 1891 and 1915, the Service hired 10 additional men with the title of "Lineman Assistants." In 1915, this title was changed to "Assistant Supervisor of Telegraph Lines." These men constituted the original telephone force of the Coast Guard. Later, as the work load increased, additional linemen were hired.

Even with 10 linemen, much of the upkeep and repairs still remained the responsibility of the station crews. The upkeep and repairs done by these men consisted of erecting poles and splicing wires to effect temporary repairs. The lineman assistants would follow up with permanent repairs when time permitted. As a result, many of the Service's early telephone people were recruited directly from the crews of these stations.

Much of the construction work done during the period 1888 to 1915 was accomplished by civilian bull gangs hired by the lineman's assistants. The salary during that period of time ran $2.00 per day for laborers and $3.23 per day for a cart horse and boy.

By 1917, because of the general expansion and improvement to the Coast Guard Coastal Communications System, an increase in the telephone force was once again necessary. At this time, 12 additional men were hired, mainly from the ranks of the telephone companies, to accomplish the necessary improvements.

In late 1918 and early 1919, eight of the original telephone force, which then numbered 22 men, were appointed Warrant Gunners (Acting). This was to be the beginning of the telephone force as a military unit, much the same as it is today. Shortly after being appointed as Gunners (Acting), all but two of these men reverted, by their own request, to permanent rating of Chief Petty Officer, even though there was no Electrician Mate (Telephone) rate at that time. The reason why most of these men reverted is simple; a CPO at that time made $22.00 more per month than an Acting Warrant.

The original telephone force was divided up into six separate divisions in the same manner as our districts are today. Each of these divisions had at least one telephone man assigned as a landlines officer.

WARRANT OFFICER CORPS

The first 22 men employed by the Coast Guard were originally civilians and were not inducted into the military rank until 1918 when the first Warrant Gunners (Acting) were appointed. On 4 November 1919, Mr. Bolton wrote a petition to the Assistant Secretary of the Treasury, signed by all of the Supervisors, requesting the creation of the rank of Chief Gunner (Electrical) and that all of the incumbent supervisors of telephone lines of the Coast Guard be commissioned as Warrant Gunner (Electrical) with pay and rank corresponding with the Navy Warrant Gunners.

The selection of the specialty of Gunner for these men arose from the fact that, at this time, the Coast Guard had only 6 Warrant specialties to choose from. They were: Warrant MASTER MATE, KEEPERS, BOATSWAINS, GUNNERS, MACHINISTS and CARPENTERS.

From 1918 until 1924, the telephone men with the rank of Warrant Gunner were listed in the Officers Register along with all the other Warrant Gunners, but were not separated or given separate designators.

The January 1925 Officers Register contained the first list showing the Warrant Gunners broken down into three separate categories. They were: Warrant GUNNERS, GUNNER (R) for Radio, and GUNNER (E) for Electrical. In addition, the 1925 Register listed only 5 Warrant specialties. They were: BOATSWAINS, GUNNERS, MACHINSTS, CARPENTERS and PAY CLERKS.

In 1926, the telephone men assigned as Warrant Gunners (E) were removed from the list of Gunners and appointed as Warrant ELECTRICIANS. From 1926 to 1962, all Warrant Electricians were appointed from the ranks of the enlisted telephone force, except for two men. The Telephone Warrants during this period were listed as Warrant Electricians (Telephone Line Duty). On one occasion two Electricians (Temporary) were appointed from Chief Electrician Mate between 1932 and 1934. These men were the only men ever listed as Warrant Electrician (Temporary). In 1935, one of these men had his Temporary Commission revoked and the

other was changed to Warrant Machinist.

ENLISTED MEN OF THE COAST GUARD TELEPHONE FORCE

The tracing of the evolution of the grades of the enlisted men of the Coast Guard telephone force posed greater problems. Unlike the Officer Corps, no official register was kept on the enlisted men.

The enlisted structure prior to 1908 consisted of two types of ELECTRICIANS. There was an "ELECTRICIAN" and an "ELECTRICIAN FIRST CLASS." The specialty designator for both consisted of four bolts of lightning (same as the present day radioman's insignia). During 1916, when the telephone force was expanding, the uniform regulations listed two enlisted Electrician specialties. First, there was the "ELECTRICIAN," which used the "Globe" as the specialty designator. This rate of "ELECTRICIAN" did not list any separate pay grades, only "ELECTRICIAN." Second, they listed the rate of "ELECTRICIAN MATE 1c, 2c, and 3c" which used the "Four Bolts of Lightning" as the specialty designator.

From what was found in Uniform Regulations, USCG, 1908 and 1918, plus a conversation with Mr. Edward Atwood ELEC2, (1919 to 1950, Retired), the authors have come to the following conclusion. First, much the same as it had been up until 1961, the only way to distinguish between an Electrician Mate and an Electrician Mate (Tel) was to ask him. Prior to 1931, there was not a separate designator or noun name for the telephone man. They were assigned to specific stations to do a specific job and were kept separate from the Electrician Mates. LCDR J. P. Johnson (Retired), one of the early telephone warrants, indicated that in the early days when an Electrician Mate was stationed on the beach, he was usually a telephone type. In those days, the Electrician Mates did not have much shore duty, and they were almost always stationed on ships. Secondly, the Electrician Mate 1c, 2c, and 3c were the telegraph operators, or radiomen as they are known today.

Between 1930 and 1931, the telephone force became known as Electrician Mate (Telephone) or EMTels. This distinguished the telephone trained personnel from the general electricians, but only on paper, since both ratings utilized the same specialty designator. This system was kept in effect until 1961. A letter received from John D. Richardson ELEC (Retired), supports this thesis. Mr. Richardson's rating in 1920 was "Electrician." The designator used was the "Globe." In the latter part of 1920, his rating was changed from ELECTRICIAN to ELECTRICIAN MATE 1c, and in 1931, his rating was again changed to ELECTRICIAN MATE (Tel).

From 1931 until 1961, the telephone force was known as Electrician Mate (Telephone). In February 1960, the Commanding Officer of the Electronic Repair Shop, Manasquan, N.J., CWO C. E. Phillips, drafted a letter to Coast Guard Headquarters requesting a specialty designator for the telephone force. A Navy IC Electricians designator was suggested. Commandant (EEE) recommended the Navy CE (Construction Electrician) designator, but the office of Chief of Staff in a memo dated 25 April 1960, recommended the designator of the Navy IC Electrician along with a name change to "Telephone Technician." This memo also stated that this change would completely divorce the "Telephone Technician" from the Electrician Mates.

The change was definitely needed, but along with the good, came the bad. Shortly after this rate change, the Warrant Electrician (ELEC) specialty was abolished, which eliminated a major and vital path of advancement in the telephone specialty.

PART II
TELEPHONE AND TELEGRAPH COMMUNICATIONS 1919 TO 1974

Until 1919, there were 416 miles of submarine cable and 3,255 miles of open wire. It furnished communication services to 282 Coast Guard stations, 44 Coast Guard offices, 139 Lighthouses, 22 Navy units, 8 Navy radio stations, 5 Army units and 25 miscellaneous units.

By 1925, the Coast Guard landline communication system, with it's Northernmost line being in Nome, Alaska, and the Southernmost line 8 miles Southwest of Key West, Fla., consisted of over 58,000 poles, 363,572 pounds of copper wire (wire inventory for uninsulated copper wire is measured in pounds), 28,000 pounds of aerial iron wire and 332,640 feet of lead covered aerial cable. This inventory served a total of 1,826 units in one form or another. Again, not all of these units were Coast Guard.

In 1926, the Coast Guard sent the first two men to Telephone School at Camp Vail, New Jersey. Operated by the Army Signal Corps, this school was the forerunner of the present day Signal Corps Schools at Fort Monmouth, N.J.

In 1929, all circuits owned by the Weather Bureau that had not already been acquired by the

Coast Guard were formally turned over at that time. These included circuits between Block Island and the mainland, Cape Henry and Cape Hatteras (which were part of the first coastal telegraph circuit in the U.S.) and the Port Angeles-Tatoosh line. The only one of these lines still in existence is the Port Angeles-Tatoosh line which also connects the Coast Guard Station at Neah Bay, WA.

Between 1933 and 1939, the Coast Guard coastal communication system consisted of 1,500 miles of poles, 2,500 circuit miles of open wire, 31 miles of aerial cable and 585 miles of submarine cable.

Interestly enough, the Coast Guard was instrumental in the development of improved manufacturing techniques in the manufacture of telephone wire, as well as submarine cable. A scientific study to determine the type of wood most suitable for telephone poles and a preservative that would protect them against termites produced good results, thus adding materially to the life of Coast Guard pole lines.

Of the six additional landlines that were constructed about that time, only one remains today. It is the line between Forks, WA. and LaPush, WA. which was completed in 1936. The river crossing poles in this line were only changed during 1972 and then only because the river banks had started to wash away, necessitating the replacing of the subject poles.

By 1938, the installation of telephone repeaters along the Long Island and New Jersey coasts materially improved the transmission of telephonic communications over Coast Guard lines. Other studies were also underway to do the same between Lewes, DL. and Morehead City, N.C.

On 7 December 1941, the Coast Guard communication system consisted of 1,600 miles of open wire and 650 miles of submarine cable, soon to be increased by an initial 1,500 miles of buried telephone wire that eventually formed the nucleus of the Beach Control circuits. The prewar circuit mileage of 4,000 miles had to be increased to over 12,000 miles to accommandate the war effort. To accomplish this task, the Coast Guard telephone force had to enlist and train over 500 additional lineman, cable splicers, equipment installers and maintenance personnel. These Coast Guardsmen built over 1,000 miles of pole line. Of this, 402 miles were of superimposed carrier (speech plus) and 268 miles of submarine cable circuits.

By mid 1942, the Coast Guard had installed an additional 4,000 miles of wire to expand the Beach Control circuits. The Beach Control circuit consisted of sections of wire, all hooked together at specified places. At intervals in the line a Commando Jack terminal was installed that enabled the men to plug in the circuit and contact to the nearest Coast Guard station. These Beach Control circuits were also compatible with commercial circuits and could be interconnected when necessary.

By 1943, the Coast Guard operated 1,728 miles of leased telegraph circuits and 1,968 miles of Coast Guard owned telegraph cir-

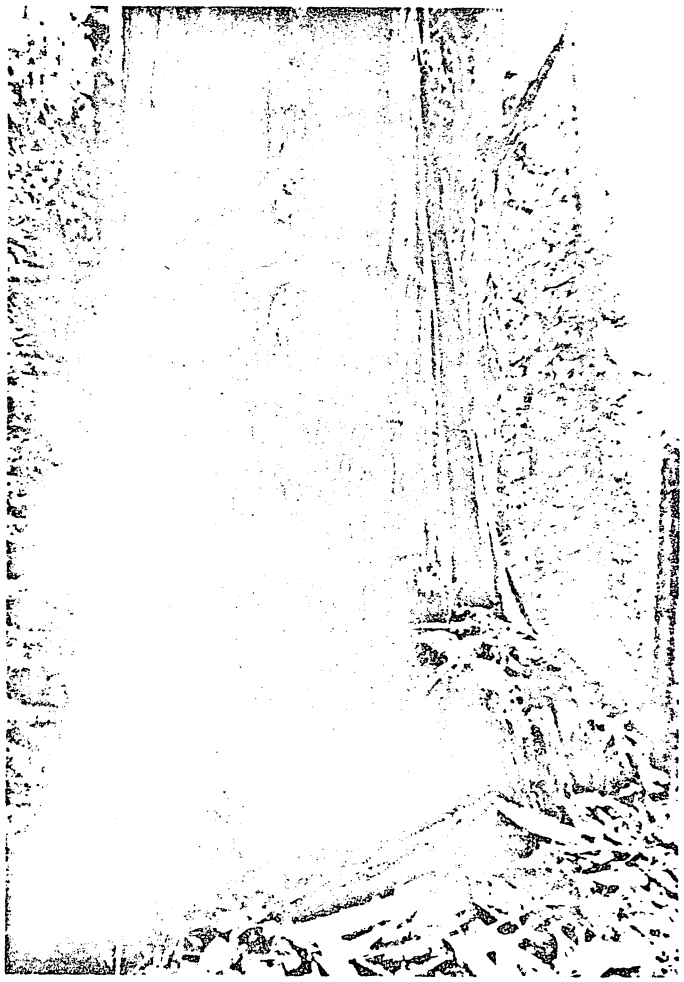


Figure 1

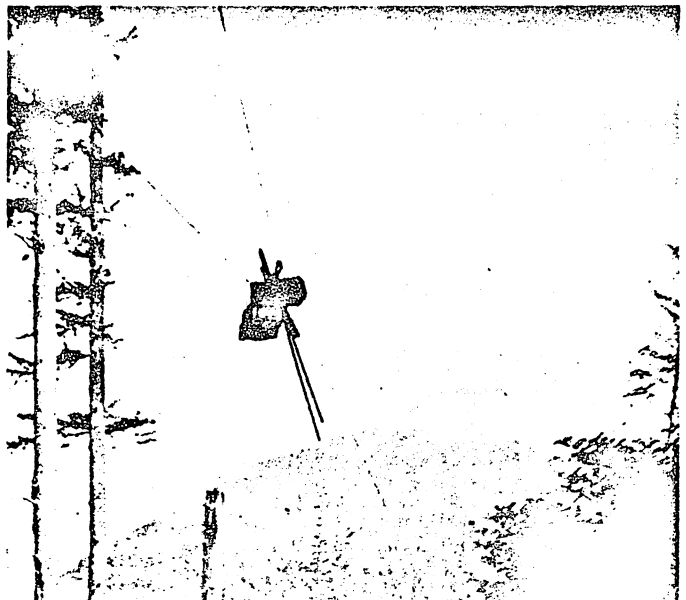


Figure 2

cuits. These figures were gradually increased to 17,000 miles of leased circuits and 2,831 miles of Coast Guard owned circuits by 1945.

In accomplishing this rapid build-up, vast quantities of equipment had to be purchased. This included, among other things, tractors and cable plows. These were used to plow in the thousands of miles of Beach Control wire and to clear rights of way for the additional miles of pole lines. In the 13th Coast Guard District there exists today, as an operating piece of equipment, one of these original tractors. These were small catapillar type vehicles, powered by a four cylinder gasoline engine and equipped with large winches. The last known of these wartime acquired tractors is located at the LaPush Coast Guard Station, LaPush, WA. This particular tractor is still used by the Coast Guard telephone force when needed, as well as various other station projects.

The erection of pole lines that were needed in the Pacific Northwest encountered problems that were unique to that area. Rights of way had to be cut through dense spruce, hemlock and fir forests. With the height of these trees exceeding 150 feet, experienced loggers were hired to cut these rights of way, as this constituted a major logging operation. See Figures 1, 2, and 3.

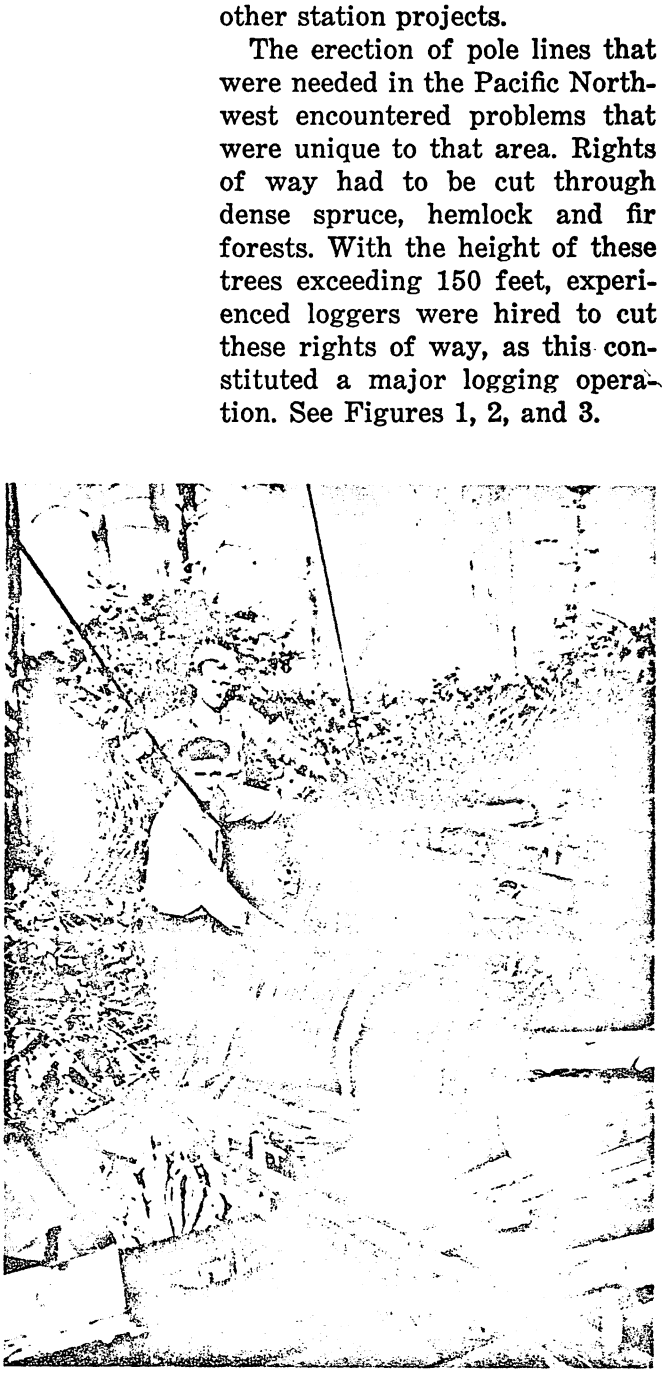


Figure 3

...k, consider the power cable ...d in 1927 to Dungenous Light ...ation, Sequim, WA. This cable ...as of the old design which ...ilized #8 solid wire conductors ...d had factory splices in it that ...ere nearly 15 feet long com...ared with the splices today ...hich never run longer than 24 ...ches. In 1972, when this cable ...as worked for the first time, it ...ontained no splices other than ...he original factory splices. This ...epresents 45 years of trouble ...ree service.

The first submarine cable lay...ng vessel employed solely for ...able work by the Coast Guard ...as the fishing vessel JOHN A. PALMER, JR. acquired on loan from the Navy Department in 1918. During 1918 and 1919, this ship worked many cables and it wasn't until the later part of 1919 that the Navy Department turned it over to the Coast Guard permanently and it was re-named the CGC PEQUOT.

In 1922, the Coast Guard acquired a minelayer named the GENERAL SAMUEL M. MILLS from the War Department. She was converted for cable recovery work and re-named as the new CGC PEQUOT. This cutter served as the cable vessel for the Coast Guard until her decommissioning in 1946.

During this period of time, the Coast Guard had more submarine cable experience than any other branch of service and was usually in charge of all Navy submarine cable installations. The only company that had more overall knowledge of submarine cable during this period of time was the Western Union Telegraph Company who had two submarine cable laying vessels of it's own. Today, the Coast Guard has the responsibility of writing the specifications for submarine power and telephone cables for the Defense Department.

From 1946 until some time during the early 1950's, the Coast Guard cable ship was the CGC YAMACRAW. After the YAMACRAW was turned over to the Navy Department, the Coast Guard needed one or more vessels capable of working submarine cable. The ship generally decided upon was the 50 foot LCM and in some isolated cases the 35 foot LCVP, although the LCVP could not take the sea that the larger LCM's could, nor hold as much cable. These vessels worked quite well for a number of years. Then in 1959, the First Coast Guard District decided to convert a 56 foot LCM for cable recovery work. This vessel was equipped with power cable drums that were capable of storing up to 5000 feet of submarine cable and the latest designed equipment for under running submarine cable when necessary. Today the original small pilot houses have been enlarged and the vessels equipped with the newest engine controls and radio communications and will soon be equipped with Radar and Depth Finders.

At the begining of World War II, the telephone force was charged with the design and initial procurement of submarine cable for under water harbor defense. Over 1,200 miles of cable was procured. The Coast Guard installed or assisted in the installation of the majority of the harbor detection cables in the Continental U.S., Alaska, Newfoundland, Cuba and the Canal Zone. Coast Guard assistance was also given to the Navy in fitting out ships suitable for cable laying, as well as the preliminary training of Navy personnel.

Because of the early involvement of the Coast Guard with submarine cable, a small laboratory was established at Coast Guard Headquarters in 1932. The purpose of this laboratory was to test the various materials that went into the construction of submarine cable. It also checked the moisture absorption and retention characteristics of submarine cable as well as aging characteristics, elasticity, tensile strength and electrical properties.

During the early days of the Coast Guard submarine cable laboratory, there was no one in the world who had done any extensive testing of submarine cable. Knowledge obtained at this laboratory was used throughout the world in the early days of telephone communication via submarine cable.

Due to lack of space, the laboratory at Headquarters was moved to Fort Trumbull, CN., in 1935. It operated there for a period of about 5 years and was again moved, this time to the present Washington Radio Station in Alexandria, VA. The laboratory made two more moves before it was finally closed down in the early 1960's.

No Coast Guard facility is in operation today for the testing and evaluation of submarine cable. The companies that manufacture submarine cable, and the Long Lines Department of AT&T do most of the testing and experimenting with new and existing types of cables.

TELETYPES

The first use of a telegraph printer by the Coast Guard was the one installed between Block Island and the New London, CN. Western Union office in 1928. The installer, CEM W. T. Westmoreland, had completed a course in printer installation and mainte-

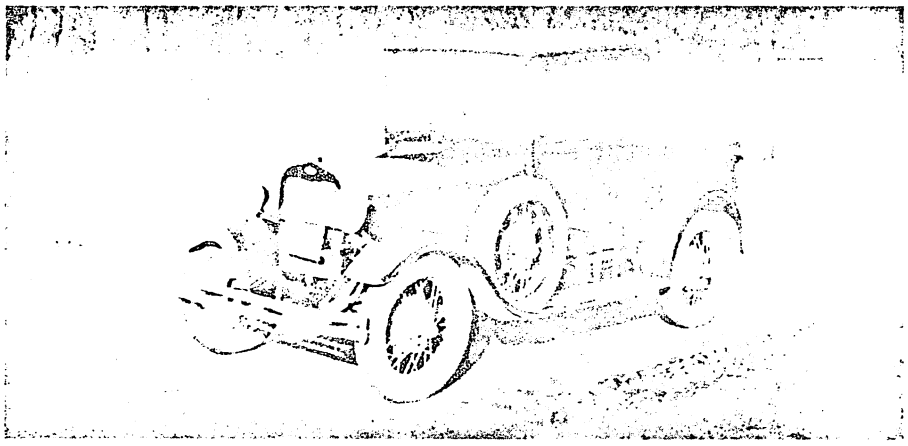


Figure 4. 1928 Model "A".

After World War II, the Coast Guard landline communication circuits were in relatively good shape. All the lines had been upgraded with modern single sideband carrier and voice repeater equipments where necessary. No major expenditures were experienced for the next 10 years except for normal maintenance on the existing plant and the periodic replacement of the large telephone construction vehicles and sections of line that were damaged by storms.

During the immediate postwar years, the telephone force took over jobs that were not directly related to telephone communications but for which they were the most qualified to perform. These included the installation and repair of all submarine cable, both power and control, for the Civil Engineering Sections, along with some tower maintenance.

The telephone force also performs the following duties today: construction and maintenance of antenna fields at all major radio stations, construction and maintenance of steel towers (usually under 100 feet) for FM radio communications, and routine maintenance on steel towers up to 350 feet in height. They also construct antenna sites in remote locations which includes fabricating concrete foundations for antenna bases or slabs for installation of pre-fab houses when needed. The total of metal towers number approximately 60 and the 90 feet wood antennas number around 500.

Along with these unrelated projects the Coast Guard telephone force maintains 1,481 circuit miles of submarine cable (not included in this figure is the power and control cables), 32,000 telephone poles, 1,850 intercom master stations, 870 pieces of teletype equipment, 1,961 circuit miles of open wire, 3,811 circuit miles of aerial cable, 1,800 circuit miles of interior cable, 4,000 circuit miles of underground direct burial cable, 95 manual switchboard installations, 47 major public address systems (ashore), 2 Micro-wave terminals and over 500 assorted types of telephone equipments (repeaters, carrier equipments, etc., not including the telephone instruments, which number approximately 3,000).

From its original 3 telephone men, the Coast Guard telephone force has expanded to over 207 enlisted men and no officers. These men are stationed at 62 separate locations throughout the Continental U.S., Asia, Europe and 23 major Coast Guard cutters that utilize Radioteletype communications as well as 8 loran stations throughout the world.

VEHICLES

Sometime in either 1928 or 1929, Coast Guard Headquarters

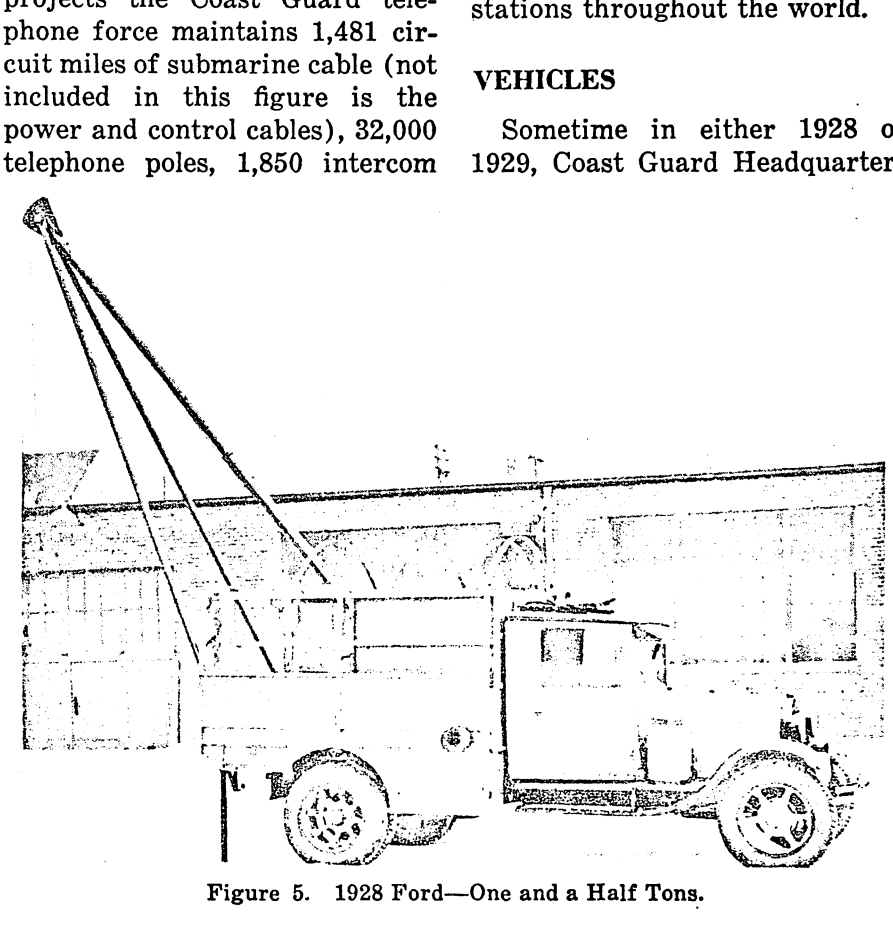


Figure 5. 1928 Ford—One and a Half Tons.

placed the first order for automobile trucks for use by the telephone force. (Figures 4 and 5) These consisted of ½ Ton pickups fitted with a sidebin type chasis and a 1½ Ton truck equipped with a windless and tripod for erecting poles up to 35 feet. The ½ Ton vehicles purchased during this period were Fords as were the first 1½ Ton vehicles.

The vehicles were bought and distributed in the same manner as today. The ½ ton pickups were assigned to smaller shops and were used for routine maintenance and trouble calls while the larger vehicles were assigned to the division headquarters. These trucks could then serve many smaller shops contained within the division.

During 1938, the telephone force acquired its first 4-wheel drive vehicles (Figure 6), which were manufactured by the FWD Truck Company. These vehicles enable the men to work faster and with less effort in the beach areas or where a conventional vehicle with 2 wheel drive could not traverse. The 4-wheel drive type vehicles are still used today, with usually one or two assigned to each District.

On many occasions, the 4-wheel drive construction trucks have been used to do many jobs that they were not originally intended to do. One of these occassions occurred in the Third Coast Guard District during the early 1960's when two line trucks were used to effect the rescue of a 44 foot MLB that had broached on the New Jersey shore. With the aid of winches, the vessel was turned to face the oncoming sea, thereby causing limited damage to the vessel until the following day when other vessels were able to tow it to deep water.

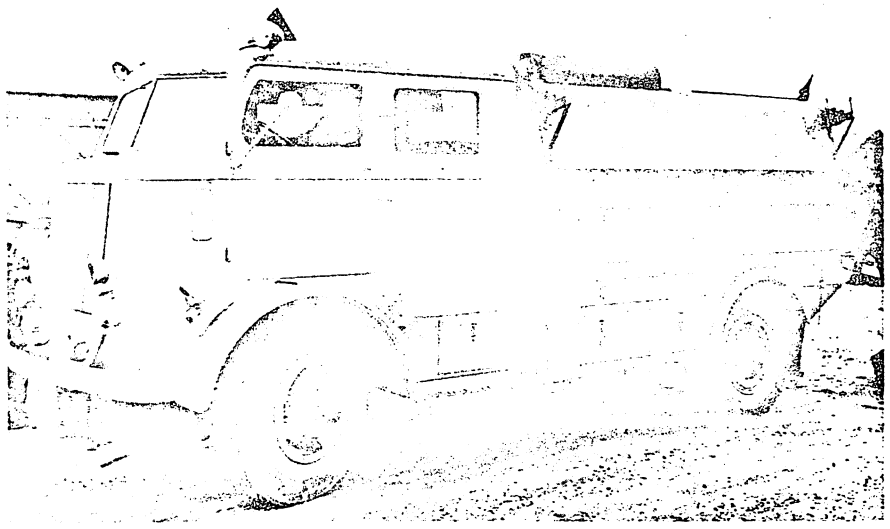


Figure 6. First Four-Wheel Drive Vehicle.

Line construction vehicles changed little during the next twenty years. In 1957, the Coast Guard telephone force purchased their most modern construction vehicle to date, equipped with hydraulic boom in lieu of the old "A" frame type that had to be put together every time it had to be used. The first construction truck equipped with a hydraulic auger and stiff legs as an integral part of the vehicle was purchased for the 5th Coast Guard District in 1958. This vehicle was also equipped with tandem rear wheels for added power and traction when working off the road, although the vehicle is too heavy to work in the beach areas. This vehicle is still in operating condition at this time. During 1968, the 13th Coast Guard District purchased the first construction vehicle equipped with a center mounted 360 degree boom, hydraulic augar and detachable fiberglass bucket that was mounted on the end of the boom when needed. These vehicles, though not as heavy duty as some previous models, are versatile and can out perform a conventional truck equipped with the older type boom.

The construction vehicles purchased during the period of 1958 to 1968 were in the $20,000.00 price range. During the early part of 1973, the same type vehicle similiarly equipped was costing in the neighborhood of $45,000.00.

SUBMARINE CABLES

During 1928, the Coast Guard installed more submarine cable than in any period since 1917. Over 275,000 feet were purchased and installed. These cables included the cable connecting Watch Hill (Fishers Island, N.Y.), Avery Point (Groton, CN), and Block Island (Green Hill, RI). In addition, cables were laid between Cape May, N.J. and Cape Henlopen, DL. The Watch Hill-Avery Point cable is still in use today after nearly 44 years of service.

To gain an idea of the reliability of submarine cable, especially where the bottom is not

nance at the Morkrum Kleinschmidt Factory, Chicago, Ill., which was one of the original manufacturers of teletype equipment. The teletype equipment used today by the Coast Guard is manufactured mostly by Teletype Corporation, which was once part of the original Kleinschmitd Company.

Never before in history had a teletype printer operated over a circuit that consisted of over 11 miles of submarine cable in addition to thousands of feet of aerial wire. The original cable that connected Block Island to New London consisted of 4 conductors (2 pair), and at the time of the printer installation, contained 3 telephone circuits which was soon increased to 5. In spite of the number of coils and end equipment (there were no repeaters in those days) used, the quality of the circuit was considerably better than when it was a simple metallic circuit and the teletype portion of the circuit worked flawlessly. This project, which was accomplished with the aid of the engineering department of the New England Bell Telephone Company, was watched by many as the success of the project would lead to many installations of printer telegraph equipment utilizing aerial and submarine cable throughout the world.

The first use of Teletype Corporation machines, as they are known today, cannot be pinned down exactly. However, a 1934 term contract to furnish spare parts for Coast Guard Model 15 teletypewriters has been located. Today, a few of these Model 15 teletypes are still in operation in the Coast Guard.

In 1945, Coast Guard leased teletype circuits were increased to over 17,000 miles and Coast Guard owned teletype circuits were being increased to 2,831 miles to accomplish the establishment of permanent service that had been temporarily furnished by the Navy during the war. The Coast Guard operated 82 Coast Guard owned and 49 leased teletype machines at the height of World War II. With the post war buildup, these totals increased to 165 Coast Guard owned and 150 leased teletype machines.

In 1961 the Coast Guard started phasing out the Teletype Corporation Model 14, 15 and 19 teletype machines with the more modern Model 28 units. This unit is still the standard machine throughout most of the world in the communication field. Some Model 35 teletypes are used by the Coast Guard where input to a computer terminal is necessary, and there are some Model 32 teletypes installed on Coast Guard aircraft.

In 1972, the Coast Guard purchased the first Model 37 teletypes for the newly constructed Communications Station, Point Reyes, CA. The advantage of the Model 37 teletype over previous models is that it can communicate in either 5 or 8 level code combinations and its speed of communication is increased to 150 words per minute, 50 wpm faster than the Model 28 equipment. From the 82 teletype machines maintained by the Coast Guard during World War II, the total has increased to over 870 teletype machines of all types that the Coast Guard owns and maintains today.

REFERENCES

1. The Headquarters historic file of the old CG magazines.
2. A monograph about the USCG published in 1947.
3. The National Archives files in Washington, D.C.
4. Numerous contacts with retired Telephone men either directly or indirectly.
   a. Edward ATWOOD, ELEC2 (Retired) of Port Angeles, WA.
   b. J. P. JOHNSON, LCDR (Retired) of Ingleside, TX.
   c. J. D. RICHARDSON, ELEC2 (Retired) of Tampla, Fl.
   d. F. P. COFFIN, ELEC4 (Retired) of Virginia Beach, VA.
5. USCG Uniform Regulations 1908 and 1918.

ABOUT THE AUTHORS

CPO Robert W. ECKEL has been in the Coast Guard for over 17 years. He is presently attached to the Telephone and Teletype Section of the Electronics Engineering Division at Headquarters. He attended Basic EMTEL (Electrician Mate Telephone) in 1958 and Telephone Technician Class B School at Groton, Conn. in 1966. His previous duty assignments include ERS Manasquan, NJ; Third CG District (eee); CG Training Centers Gronton, Conn. and Governors Is., NY, and CG Telephone Shop, Port Angeles, WA.

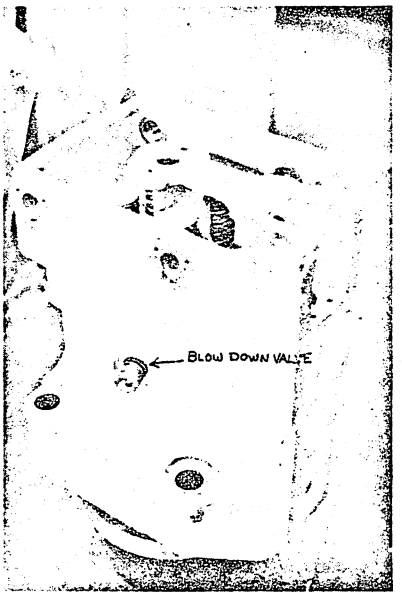
CWO Raymond (n) SNOW has over 18 years in the Coast Guard. His present assignment is the Telephone and Teletype Section of the Electronics Engineering Division at Headquarters. In 1957, he attended Basic EMTEL School and in 1961, Telephone Technician Class B School at Groton, Conn. His previous duty assignment include ERS (LL) Virginia Beach, VA; Group Ft. Macon, Morehead City, NC; Group Chincoteague, Chincoteague, VA; and EMO aboard the USCGC DUANE.

The Coast Guard Engineers' Digest

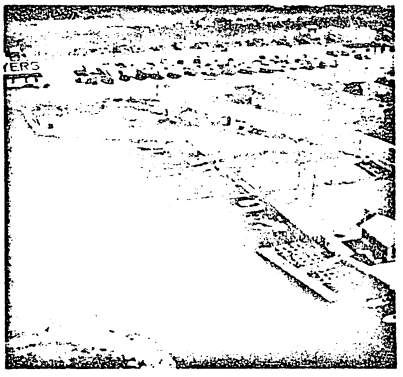
TABLE OF CONTENTS

January–February–March 1975

GATE Project p. 7



Cylinder Head Conversion p. 58



3rd District Construction p. 71

The Coast Guard Engineer's Digest is compiled in the Office of Engineering, U.S. Coast Guard Headquarters and is published by the Government Printing Office. Advertisements will not be printed and subscriptions are not available. Requests for individual issues may be submitted to the Editor.

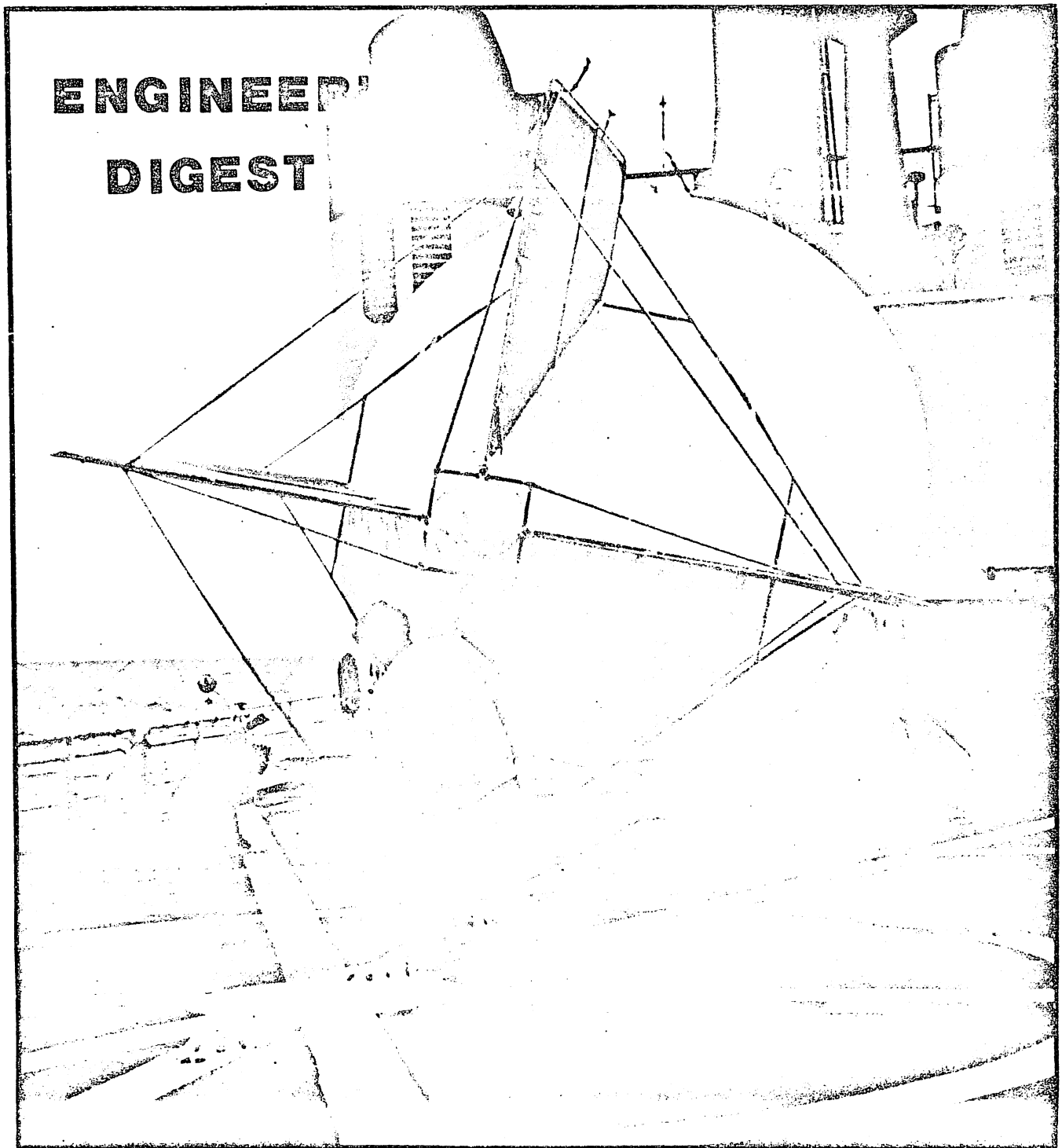
Chief, Office of Engineering
RADM M. E. Clark
Deputy Chief, Office of Engineering
CAPT A. P. Manning
Acting Editor
Mrs. Anita Amos

Dist: (SDL 100)
A: acde(8); ghmv(5); klnopqrst(2); ij(1)
B: e(120); g(30); cn(20); f(15); h(12); k(8); bjlr(4); i(3); mq(2); dp(1)
C: abdk(4); n(3); efgmo(2); hijlpqrstuvwxz(1)
D: ef(3); abdimsvz(2); cjklnoprtuxy(1)
E: None
F: k(1)
Special List No. CG–15

DEPARTMENT OF TRANSPORTATION

COAST GUARD

ENGINEER DIGEST



Number 186

CG-133

JAN–FEB–MAR 1975