Science Museum Library and Archives
Science Museum at Wroughton
Hackpen Lane
Wroughton
Swindon
SN4 9NS

Telephone: 01793 846222
Email: smlwroughton@sciencemuseum.ac.uk

# MS/2028

Papers relating to submarine telegraph and telephone cables collected by J. R. Vezey during his work as a cable engineer

Compiled by John Ricketts Vezey

**MS/2028**

**Collected whilst Vezey worked for Messrs Clark, Forde & Taylor (1923-28), Standard Electric Corporation (1928-31) and Standard Telephone & Cables Ltd (1936-40).1 box. [Papers re submarine telegraph and telephone cables, 1923-1940. Collected by John Ricketts Vezey during the course of his career as a cable engineer, and presented by him to the Science Museum Library in 1979. The papers are in five folders, each one being split into sections]**

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*Folder 2: Non-loaded telegraph cables ( in 5 sections)*

*2.1 Details of cores*
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## 2.1 Details of cores

2.1.1 Dimensions of conductors and cores

2.1.2 Capacity constant for unloaded cores

2.1.3 Electrical characteristics of cores

2.1.4 Electrical characteristics of standard cores in B.T. Units

2.1.5 Curves showing variation of weight of conductor and weight of gutta percha

2.1.6 Tables of temperature coefficients for the D.R. of gutta percha. 7% and 8.2%

## 2.2 Details of core serving and armouring

2.2.1 Necessary space allowance for core serving

2.2.2 Weight of core serving

2.2.3 Table for ascertaining the tensile strength of wire in tons per sq. inch

2.2.4 Diameter over sheathing wires

2.2.5 Weight of sheathing wires

2.2.6 Specification limits for sheathing wires

2.2.7 Lays of sheathing wires

2.2.8 Weights of various types of cable in water and breaking strains

2.2.9 Mechanical data of Commercial Cable Co's 1923 Atlantic cable

## 2.3 Laying problems and cable ship details

2.3.1 Paying out strains

2.3.2 C.S. *Faraday*

2.3.3 C.S. *Citta di Milano*

2.3.4 Photograph of C.S. *Dominia*

2.3.5 C.S. *John W Mackay* and C.S. *Marie Louise Mackay*

2.3.6 C.S. *Ampère* and C.S. *Cable*

2.3.7 C.S. *Toyo Maru*

2.3.8 Report on Malaga-Las Palmas cable 1925

2.3.9 Memo on 'Difficulties of Laying and Repairing Heavy Cable in Deep Water', 27 Jun 1929

2.3.10 Memo discussing effect of slack and ships speed on paying out strains and design of armouring for the proposed Atlantic telephone cable, 25 Jul 1930

2.3.11 'The Recovery of Deep-Sea Cable'/J C Besly & H V Higgitt, from **I.E.E. Journal** 17 Mar 1932

2.4 Cost of cables

2.4.1 Graphs showing costs of non-loaded and loaded cores and deep sea armouring of submarine telegraph cables; (probably 1928 or 29)

2.4.2 Depreciation of submarine telegraph cables

2.4.3 Tender prices for submarine telegraph cables for the All America Co. in Venezuela waters, Jan 1930

2.5 Published papers

2.5.1 'Certain factors affecting telegraph speed'/H Nyquist for Western Electric Co., May 1924

2.5.2 'Methods and equipment in cable telegraphy'/H Kingsbury & R A Goodman. **I.E.E. Journal**, May 1932

2.5.3 'Empire telegraph communications'/K L Wood. **I.E.E. Journal**, Jun 1939

2.5.4 'The localisation of exposed breaks in submarine cables'/A L Storey. **I.E.E. Journal**, Sept 1939

2.5.5 'Fanning Island' in **Siemens Magazine,** Jun 1927

2.5.6 'Convict Island'/Fernando Noronha. **Siemens Magazine,** Aug 1925

2.5.7 'Around the map on a cable ship'/P E Cheesman

*Folder 3: Continuously loaded telegraph cables (in 3 sections)*

*3.1 Design and cost details*
*3.2 Proposals for intermittent loading and two layers of loading*
*3.3 Published papers*

3.1 Design and cost details

3.1.1 'Recent developments in submarine cable design'/R L Hughes. **I.E.E. Journal,** Jan 1928 (written 1926)

3.1.2 Memo describing effect of how loading by 'nickel-iron' alloys had revolutionised the art of submarine cable telegraphy. (1925 or 26?)

3.1.3 Empirical formulae for loaded cable design

3.1.4 Curve showing various sizes of loaded cores

3.1.5 Tables giving the mechanical and electrical data, attenuations and working speeds of six completed loaded cables. (1927?)

3.1.6 Investigation into methods of forming a comparison between the results obtained on various loaded cables and the relative costs. (1927?)

3.1.7 Proposal to ask the contractors for a guarantee of only 75% of the designed speed

3.1.8 Details of the Baltic Experimental cable loaded with '*Invariant*'. (See 3.1.1)

3.2 Proposals for intermittent loading and two layers of loading

3.2.1 Comparison of costs of fully and intermittently loaded cables

3.2.2 'Economical design of loaded telegraph cables'/E S Heurtley. **The Electrician,** 9 Mar 1928

3.2.3 Comparison of cost of intermittent loading and full loading of the proposed Trans Pacific-Northern Route cables

3.2.4 Comparison of costs using two layers of loading instead of one

3.3 Published papers

3.3.1 'Permalloy'/H D Arnold & G V Elmen for Western Electric Co., Jun 1923

3.3.2 'Permalloy Loaded Cable'/F B Jewett. Electrical Communication, Apr 1924

3.3.3 'The Loaded Submarine Telegraph Cable'/Oliver E Buckley for Bell Telephone Laboratories, Aug 1925

3.3.4 'Extraneous interference on submarine telegraph cables'/J J Gilbert for Bell Telephone Laboratories, Aug 1926

3.3.5 'Automatic printing equipment for long loaded submarine telegraph cables'/A A Clokey for Bell Telephone Laboratories, Sept 1927

3.3.6 'The continuously-loaded submarine telegraph cable'/A E Foster, P G Ledger & A Rosen. **I.E.E. Journal**, Jul 1928

3.3.7 'Alternating-current tests on high-speed telegraph cables'/E W Smith. **I.E.E. Journal**, Apr 1930

3.3.8 'The resistance-terminated, balanced sea-earth of a taper-loaded submarine telegraph cable'/C R Fielden. **I.E.E. Journal**, Jan 1932

*Folder 4: Single core co-axial telephone cables (in 5 sections)*

*4.1 Tenerife-Gran Canaria and Algeciras-Ceuta cable systems*
*4.2 Continuously-loaded cables*
*4.3 Non-loaded cables*
*4.4 Technical problems*
*4.5 Insulation materials*

4.1 Tenerife-Gran Canaria and Algeciras-Ceuta cable systems

4.1.1 Three papers:

a) 'Some economic factors in the design of single core submarine cables for carrier telephony'/J R Vezey
b) 'The Tenerife-Gran Canaria and Algeciras-Ceuta systems'/Fred T Caldwell
c) 'Tenerife-Gran Canaria and Algeciras-Ceuta submarine cables'/K E Latimer & J R Vezey

4.1.2 'The characteristics of submarine telephone cables at carrier frequencies'/E W Smith. **I.E.E. Journal,** Oct 1932

4.1.3 Damping constants

4.1.4 Tenerife-Gran Canaria cable. Core sizes

4.1.5 Skin effect on the Algeciras-Ceuta cable

4.1.6 Reports on the manufacture and laying of the two cables

4.2 Continuously-loaded cables

4.2.1 'Key West-Havana submarine telephone cable system'/W H Martin, G A Anderegg & B W Kendall for A.I.E.E. Convention, Feb 1922

4.2.2 Cost of silicon-iron wire. Feb 1929

4.2.3 Details including costs of Italy-Sardinia cable. 1932

4.2.4 'Intermodulation in loaded telephone cables'/K E Latimer. Jan 1936

4.2.5 Tests on sample of thin tape loading. Mar 1937

4.2.6 Estimation of singing point of unallocated continuously loaded cables

4.2.7 Thin tape loading tests. Feb 1938

4.2.8 Proposed Toulon-Ajaccio cable

4.2.9 Intermodulation in continuously loaded cables. Tests on one N.M. of core. May 1940

4.2.10 Toulon-Philippeville cable. Estimates of 3rd harmonic intermodulation

4.2.11 'The future of transoceanic telephony'/Oliver E

Buckley. **I.E.E. Journal,** Oct 1942

4.3 Non-loaded cables

4.3.1 Specification for Key-West-Havana 1931 cable

4.3.2 Key West-Havana 1931 cable details

4.3.3 Australia-Tasmania cable 1935

4.3.4 Soya Strait cable 1935?

4.3.5 Anglo-Dutch cable 1937

4.3.6 British Columbia Telephone Co. 1937

4.3.7 Cook Strait cable 1937

4.3.8 Nevin-Howth cable 1937

4.3.9 Nevin-Howth cable 1938

4.3.10 Portpatrick-Donaghadee cable 1937

4.3.11 Channel Islands cables 1938

4.3.12 Proposed cable for Messina Straits

4.4 Technical problems

4.4.1 'Transmission characteristics of the submarine cable'/John R Carson & J J Gilbert. **Journal of the Franklin Institute,** Dec 1921

4.4.2 Skin effect of central conductor

4.4.3 Return resistance at different frequencies

4.4.4 Weights of outer return conductors

4.4.5 Tables and formulae supplied by D P Dalzell for calculating the various electrical constants of single core loaded and unloaded cores

4.5 Insulation materials

4.5.1 Memoranda comparing the dielectric constants of different materials

4.5.2 D.C. Dielectric constants for paragutta

4.5.3 Telcothene

4.5.4 'Submarine insulation with special reference to the use of rubber'/R R Williams & A R Kemp for Bell Telephone Laboratories, Feb 1927

4.5.5 'Hydrocarbon in raw rubber, gutta-percha and related substances'/A R Kemp for Bell Telephone Laboratories, May 1927

4.5.6 'Brittleness tests for rubber and gutta-percha compounds'/G T Kohman & R L Peek for Bell Telephone Laboratories, Feb 1928

*Folder 5: Submarine telephone cables mainly for shallow waters (in 4 sections)*

*5.1 Lists of different types of cables*
*5.2 Details of individual gutta-percha cables*
*5.3 Details of individual paper-insulated lead-sheathed cables*
*5.4 Technical details of lead-sheathed cables*

5.1 Lists of different types of cables

5.1.1 Summary of the more important submarine telephone cables, divided into four main types up to 1930

5.1.2 Non-loaded paragutta insulated submarine cables 1931-1938

5.1.3 Non-loaded paper-insulated submarine cables 1933-1939

5.1.4 Submarine telephone cables in Japan

5.1.5 Lead-covered cables laid by Western Electric

5.2 Details of individual gutta-percha cables

5.2.1 Sweden-Gottland 1920

5.2.2 Anglo-Irish 1922

5.2.3 Indo-Ceylon 1934

5.2.4 Carrier telephone system on 4 core telegraph cable across the Tsugaru Strait

5.3 Details of individual paper-insulated lead-sheathed cables

5.3.1 Leba-Tenkitten 1920

5.3.2 Second Anglo-Dutch 1924

5.3.3 Third Anglo-Dutch 1926

5.3.4 Anglo-Belgian 1926 and Anglo-French 1927

5.3.5 Fourth Anglo-Dutch 1927?

5.3.6 Kampinge-Zarrenzin 1927

5.3.7 Sweden-Finland 1928

5.3.8 Leba-Pillau 1929

5.3.9 Anglo-French 1930

5.3.10 Anglo-Belgian 1930

5.3.11 Sweden-Gottland 1930

5.3.12 Golden Gate (San Francisco) 1930

5.3.13 Kampinge-Zarrenzin 1930

5.3.14 Anglo-Belgian 1932

5.3.15 Anglo-French 1933

5.3.16 Great Belt cables 1933 & 1934

5.3.17 Oneda-Karita, Kynshu 1936

5.3.18 Mariehamm-Abo cables 1939

5.3.19 St Margaret's Bay-Sargatta 1939

5.4 Technical details of lead-sheathed cables

5.4.1 List of sheath details and maximum depths of lead-covered cables

5.4.2 Sheath thicknesses

5.4.3 Inner serving thicknesses

5.4.4 Sheath thicknesses, inner serving and armouring details

5.4.5 Leakance of paper-insulated cables

## 5.4.5 Copper resistance of quadded conductors

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