

Route Clearance for Hibernia Express and the findings

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Abstract: During the route clearance of Hibernia Express, a cable which has taken an old route across the Atlantic, but a route that hasn't been used for almost 100 years, more than fifty different cables were recovered. The oldest cable recovered was from the early 1880s and the latest from the 1970s so there is the best part of one hundred years of cable history in one route clearance. As part of the route clearance samples of all the recovered cables were kept, researched and where possible, positively identified. The positively identified samples show an interesting change in cable design over the years. This paper traces the history of these recovered cables and speculates on the use of some of the unidentified cables.

1. HIBERNIA EXPRESS ROUTE

The Hibernia Express route as shown below takes a non traditional fiber optic route across the Atlantic, eschewing the usual deep water routes in order to minimise the route length between the UK and Canada. This route is not new to the cable industry but hasn't been used since the telegraph cables of the early part of the 20th century.

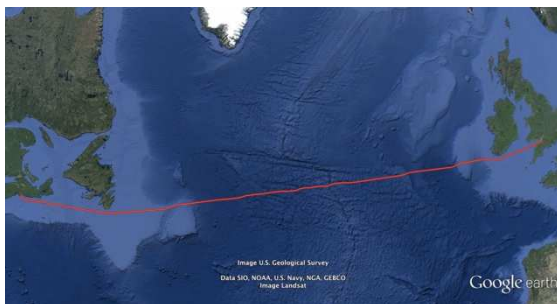


Figure 1. Hibernia Express Route

The route from Halifax, NS stays on the Scotian Shelf then traverses the Grand Banks before crossing the Atlantic and coming onto the European shelf. The European shelf component stays on the Porcupine Bank before coming round

Fastnet Rock and then straight up the Bristol Channel to Breen.

2. THE OUT OF SERVICE CABLES

During the Desktop Study it became apparent that the route would involve very many more Out of Service (OOS) cable crossings in shallow water than a normal trans Atlantic cable route would encounter.

There were a total of eighty-two OOS cable crossings of which seventy were in water depths less than 1500m the limit of ploughing. Of these seventy to be cleared forty-two were on the Scotian shelf and the Grand Banks with the remaining twenty-eight on the European Shelf.

This meant that there were two significant campaigns, one Western and one Eastern of route clearance prior to the main lay beginning.

3. WESTERN CAMPAIGN

The Western Campaign required forty-two OOS cable crossings to be cleared, this was only twenty-seven distinct cables,

since there were multiple crossings of some cables.

These multiple crossings were of :
St. John's – Halifax
Canso – St. John's

This was not a surprise since the routes of the above three cables is very similar to the route of Express across either the Scotian shelf or the Grand Banks.

A map of the crossings with the telegraph cables in cyan and Express in red as follows:-

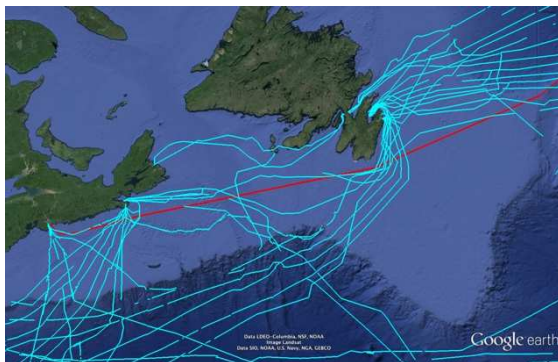


Figure 2: Western Campaign Crossings

The main lay from Halifax was due to commence in late April so this put two restrictions for the Western campaign route clearance, firstly the sheer amount of cable to be cleared, forty-two cables with up to 1km of each, and the prevailing ice conditions. Taking these two pre-conditions into account it was decided to use the CS Decisive a TE Subcom R Class main lay vessel as the route clearance vessel. This gave Hibernia both the cable handling and capacity as well as a greater working weather window, although still susceptible to ice bergs and sea ice, the R Class vessels having a limited ice rating.

A further complication was the Canadian Coastal Trading Act, which covers amongst other things restricting foreign

flagged vessels working within the Canadian territorial waters. Because of this limitation, it was decided that the main lay vessel, CS Resolute would carry out the route clearance within Canadian territorial waters, leaving the CS Decisive to do the route clearance from the 12 mile limit to the end of burial, some fifteen hundred kilometres.

The CS Decisive spent eighty seven days doing the route clearance and pre lay grapnel run, whilst avoiding sea ice and icebergs

4. EASTERN CAMPAIGN

The Eastern Campaign required twenty eight OOS cable crossings to be cleared, this was only eleven distinct cables, since there were multiple crossings of some cables.

These multiple crossings were of:

St John's - Waterville No. 3
Waterville – Weston super Mare No. 1
Waterville – Weston super Mare No. 3

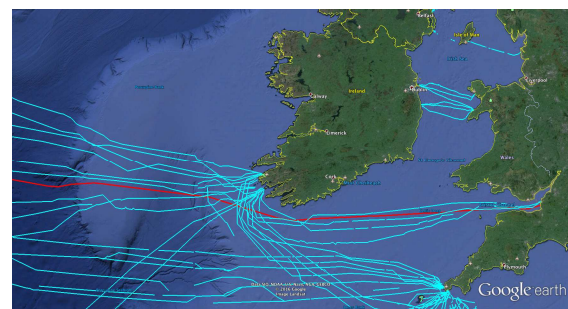


Figure 3: Eastern Campaign Crossings

There were no ice issues with the Eastern Campaign however the sheer quantity of cable to be recovered, in particular the OOS fibre cables, this was a result of the route through the Bristol Channel and towards Fastnet at the south west coast of Ireland.

To help with this TE Subcom made use of four vessels in total to do the route clearance and pre lay grapnel run. The four vessels were DSV Atlantic Guardian, CS Ikaros, CS Ile d’Aix and CS Ile de Brehat. With a combination of the four vessels taking a total of 145 days to complete all the work. There was a small amount of weather downtime amongst this however the seabed conditions dictated the work rate.

Similar to the Western Campaign the route across the Porcupine Bank to the west of Ireland had been used in the telegraph era but this was the first cable there for over one hundred years. The other similarity is the oil and gas exploration on the Porcupine Bank and the Grand Banks, although the depressed oil price has suppressed the majority of the speculative drilling due to costs.

5. CABLES RECOVERED

During the route clearance, quite a number of items were recovered, not just cables but fishing nets, wires, trawl doors and other seabed paraphernalia.

	Western Campaign	Eastern Campaign
Identified Telegraph Cables	20	16
Unknown Telegraph Cables	7	1
Unknown Coaxial Cables	2	6
Fibreoptic Cables	0	7
Fishing Gear	6	4
Wires & ropes	8	9

Table 1: Quantities of items recovered

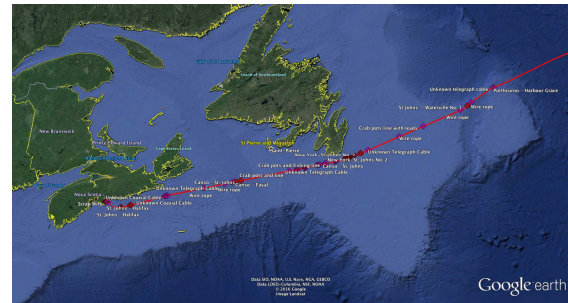


Figure 4 Western Campaign Locations

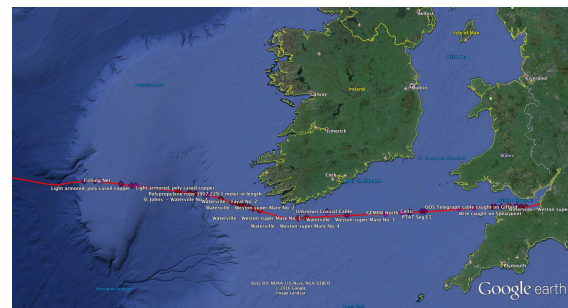


Figure 5 Eastern Campaign Locations

Since it was known that so many cables would be recovered each vessel was requested to keep samples of any cables that were recovered, this has allowed some research into the cables and their history.

A full list of the cables recovered is appended to the end of this paper as Table 2.

In the Table it should be noted that where it is stated that a Telegraph Cable is Known then the data has been retrieved from either the Global Marine Systems Ltd database or TE Subcom’s own database of telegraph cables, this has been added to by looking at the structure of some of the cables and comparing that with known examples. This has meant that some gaps have been filled in the database.

Within the recovered cables there was a marked difference in the survivability of

some of the cables, with the Halifax – St. John’s and Canso – St. John’s both being recovered with their serving intact, even though they were installed almost sixty years apart. This can be attributed to either less bottom fishing activity or a more benign seabed environment.

The cables recovered in the Eastern Campaign were in the majority of much less survivability and almost all of them had very little if any outer serving.

6. THE CABLES OF INTEREST

Canso and Halifax to St. John’s

These cables were installed in 1894 and 1952 respectively but in construction there is almost no difference, the main difference being the size of the central conductor. The 1952 cable having a much smaller centre conductor and more insulant than the earlier cable even though it is about 400km longer.

Unknown Telegraph Cable at KP1492.669

This cable that was recovered at a water depth of about 1300m is not a traditional telegraph cable as there was no outer armouring just serving. The cable shown below is 12mm in diameter, without the serving and has an inner conductor diameter of 6mm.



Figure 6: Unknown Telegraph Cable

Waterville to Weston super Mare Cables

By good fortune the complete series of the four Waterville to Weston super Mare cables were recovered. The dates for the installation of these cables varies from 1885 to 1923. Presuming that all the cables have been identified correctly then No. 1, 3 & 4 are all of a similar standard construction with central conductor, insulant and armour wires. The difference between them is that the armour wires have changed in size and the insulant has decreased in diameter. No. 2 is of a very different construction with four separate conductors each with their own insulant armouring and serving wound around each other.

Dual Conductor Cables

Two cables were recovered that had dual central conductors, these being an unknown telegraph cable at KP268.655 on Seg 2 as well as the Sennen Cove - Valentia No. 3 cable. These dual conductor cables were normally used close to the shore with one of the conductors acting as the earth and the other as the main conductor. However both of these cables were recovered some seventy kilometres from the shore, meaning that they were unlikely to be using the second conductor as an earth.

7. FINAL THOUGHTS

The fact that so many of the telegraph cables were near their charted position as well as being in remarkably good condition is testament to the ability of the Victorians and Edwardians to manufacture a high quality product as well as their ability to install cables just using the sun and the stars. The unknown cables whether they be

the telegraph of coaxial cables through up more questions than they answer. The coaxial cables could all presumed to be of military extraction, particularly the four recovered off the south west of Ireland, although this is difficult to prove. Possibly the most interesting is the single cored cable that was recovered from deeper water off of the Grand Banks, this very thin un-armoured cable is unlikely to be of a commercial nature and could be a relic from the cold war of the 1970s.

Table 2: Cables recovered during the Route Clearance of Hibernia Express

Ref	Seg	Description	KP	Installation Date	Type
1	1	St. Johns – Halifax	1.036	1952	Known Telegraph Cable
2	1	Bermuda - Halifax	2.164	1890	Known Telegraph Cable
5	1	St. Johns – Halifax	67.597	1952	Known Telegraph Cable
6	1	St. Johns – Halifax	102.8	1952	Known Telegraph Cable
7	1	St. Johns – Halifax	104.749	1952	Known Telegraph Cable
8	1	Unknown Telegraph Cable	234.348		Unknown Telegraph Cable
9	1	Unknown Coaxial Cable	240.751		Unknown Coaxial Cable
10	1	Unknown Coaxial Cable	240.887		Unknown Coaxial Cable
12	1	Unknown Telegraph Cable	449.395		Unknown Telegraph Cable
14	1	Canso - Fayal	489.293	1923	Known Telegraph Cable
15	1	Canso – St. Johns	508.217	1905	Known Telegraph Cable
18	1	Unknown copper core cable	737.971		Unknown Telegraph Cable
19	1	Unknown copper core cable	738.256		Unknown Telegraph Cable
21	1	Canso - St. Johns	789.835	1894	Known Telegraph Cable
22	1	Unknown Telegraph Cable	789.922		Unknown Telegraph Cable
26	1	Canso – St. Johns	884.57	1894	Known Telegraph Cable
27	1	Canso – St. Johns	885.09	1894	Known Telegraph Cable
28	1	Canso – St. Johns	885.748	1894	Known Telegraph Cable
29	1	Canso – St. Johns	885.822	1894	Known Telegraph Cable
30	1	St. Johns – Halifax	897.205	1952	Known Telegraph Cable
31	1	Hammel – Bay Roberts No. 2	901.733	1926	Known Telegraph Cable
32	1	Hammel – Bay Roberts No. 2	901.827	1926	Known Telegraph Cable
33	1	Brest - St. Pierre	919.898	1869	Known Telegraph Cable
34	1	New York-St. Johns No. 2	924.076	1912	Known Telegraph Cable
35	1	New York-St. Johns No. 2	942.802	1912	Known Telegraph Cable
36	1	Unknown Telegraph Cable	971.35		Unknown Telegraph Cable
40	1	St Johns - Waterville No. 1	1368.634	1884	Known Telegraph Cable
42	1	Porthcurno - Harbour Grace	1492.275	1874	Known Telegraph Cable

43	1	Unknown telegraph cable	1492.669		Unknown Telegraph Cable
48	1	Light armored, poly cased copper	3766.422		Unknown Coaxial Cable
49	1	Light armored, poly cased copper	3774.297		Unknown Coaxial Cable
50	1	Light armored, poly cased copper	3775.17		Unknown Coaxial Cable
51	1	Light armored, poly cased copper	3851.524		Unknown Coaxial Cable
52	1	St Johns - Waterville No. 3	3871.235	1894	Known Telegraph Cable
53	1	St Johns - Waterville No. 3	3874.99	1894	Known Telegraph Cable
54	1	Porthcurno - Harbour Grace	3884.892	1874	Known Telegraph Cable
57	1	St Johns - Waterville No. 2	3931.417	1884	Known Telegraph Cable
58	1	Waterville - Fayal No. 2	3954.467	1923	Known Telegraph Cable
59	1	Sennen Cove - Valentia No. 3	3962.326	1923	Known Telegraph Cable
60	1	Velentia - Le Havre	3967.796	1920	Known Telegraph Cable
61	1	Porthcurno - Harbour Grace	3971.316	1874	Known Telegraph Cable
62	1	Waterville – Weston super Mare No. 3	3985.672	1910	Known Telegraph Cable
63	1	Waterville – Weston super Mare No. 2	3994.351	1901	Known Telegraph Cable
64	1	Waterville – Weston super Mare No. 1	4007	1885	Known Telegraph Cable
65	1	Waterville – Weston super Mare No. 4	4073.859	1923	Known Telegraph Cable
66	1	Waterville – Weston super Mare No. 3	4093.255	1910	Known Telegraph Cable
77	2	OOS Telegraph cable caught on Gifford	268.655		Unknown Telegraph Cable
78	2	Waterville – Weston super Mare No. 1	302.499	1885	Known Telegraph Cable
81	2	Waterville – Weston super Mare No. 1	333.915	1885	Known Telegraph Cable
83	2	Waterville – Weston super Mare No. 1	357.458	1885	Known Telegraph Cable
85	3	Unknown Coaxial Cable	38.647		Unknown Coaxial Cable
86	3	Unknown Coaxial Cable	39.214		Unknown Coaxial Cable