Report[1]

REPORT ON THE OPERATIONS TO LAY THE 35,000VOLT, 3X50M/M^2 SARAYBURNU-SALACAK AND THE 10,000VOLT, 3X50M/M^2 TARABYA-BEYKOZ UNDERSEA CABLES

REPORT ON THE OPERATIONS TO LAY THE SARAYBURNU-SALACAK 3X50MM^2 235KW UNDERSEA CABLE AND THE TARABYA (NALETBURNU)-BEYKOZ (SERVIBURNU) 3X50MM^2 10,000KW UNDERSEA CABLE

I.-LAYING THE CABLE BETWEEN TARABYA AND BEYKOZ:

In line with the plan of work, 1,310 metres of the 3x50mm^2 10kW undersea cable at the Sarayburnu-Salacak site of operations was removed in three sections and transported to the Tarabya-Beykoz site of operations on June 19-21, 1940. Laying of the Tarabya Naletburnu-Beykoz Serviburnu undersea cable and installation of three compatible junction boxes was completed on June 22-28, 1940. At Tarabya, a 30m length of the undersea cable was left on land to link the cable to transformer station no.70; at Beykoz (Serviburnu) a 60m length was left exposed on the Sokoni property to connect this cable to the centre.

The process of removing the cable sections from Sarayburnu and finalising operations at the Naletburnu-Serviburnu sites was completed in ten days.

When the Sarayburnu-Salacak cable was drawn in at Salacak, it was found to have been damaged at the 318th metre by contact with a ship's anchor. The damaged section was removed and operations continued.

II.- REPLACEMENT OF FLOATING PONTOON FOR 35-KILOWATT CABLE OPERATION:

After the above-mentioned operation, the repair pontoon with the remaning 600 metres of cable was towed to the Silahtar facility, unloaded and the modifications as outlined in the notice dated 30.11.1939 were started to place the 3x50 square millimetre 35 kW cable drums to be released between Sarayburnu and Salacak.

III.-RELEASING OF THE 35-KILOWATT CABLE AND IT'S JUNCTION BOX:

Repairs and positioning of the 25- and 50-ton cable drums was completed on the evening of 14.7.1940. On the morning of the next day (15.7.1940), by transporting therepair pontoon to Sarayburnu, 15 metres of cabling was unreeled from the 50-ton cable drum and laid on land. Then laying of the cable on the seafloor began. Laying of this 1,596m section of cable was completed in three days, when, in line with pre-operational calculations, it came to rest in the calm waters at the Maiden's Tower. Here, preparations were made for this section to be connected to the second

[1] The originals of the document series are preserved in Silahtarağa Archive with the code R.3189. The report is translated from Turkish to English by Catherine Mary Campion Işık.

section awaiting it on the 25-ton cable drum. Our department supervisors, working night and day, completed installation of the junction box in thirty-five hours.

Cable-laying operations continued on 19/7/1940 with a 280m section of cable on the second cable drum laid between this junction box and Salacak. The work was completed late in the evening of the same day. Of the cable section's 280m, 24m were on land at Salacak.

Thus, in the brief time of five days, beginning on the morning of the 15/7/1940 and completed on the evening of 19/7/1940, the laborious and dangerous task of laying 1,876 metres of undersea cabling was accomplished without incident.

Following checks on the cable, floor space, and the land connection points, the cable began operating on 22/7/940, presently at 10kV.

Of the 800 metres of cabling on the cable drum, there remained 520 metres. This was removed and taken to the park at Silahtarağa for storage as a reserve supply.

IV.- CHECKS ON THE PROTECTIVE STEEL WIRING:

Inspections were performed at two points on the Sarayburnu-Salacak undersea cable's protective steel wiring, during which they were found to have snapped or become decayed in places. As the damaged protective steel wiring were removed and replaced with new wiring, a steel casing wire was also placed on both sides of the cable laid between Tarabya Naletburnu and Selviburnu.

Controls were also carried out on the wiring on undersea cables 1, 2, 3, and 4 that run between Arnavütköy and Yeniköy and the necessary repairs made.

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TECHNICAL DEPARTMENT DIRECTORATE

Istanbul, 30.11.1939

GENERAL DIRECTORATE

Summary: On laying of the Sarayburnu-Salacak undersea cable

The previously laid 3.50mm^2 35kW Beyazıt-Sarayburnu and Salacak-Karacaahmet underground cables were laid to cope with a future expected capacity of 35kW. These underground cables are operational, but presently connected by the 3x50mm2 10kW Sarayburnu-Salacak undersea cable. To replace this 10kW cable, in early 1935 the company imported 2,400 metres of 3x50mm^2 35kW undersea cabling. This was later discovered in a warehouse with its cable drum in a state of decay.

Approval of the Ministry of Welfare was sought in order to have this cabling laid as soon as possible to and put it into service under a voltage of 10 kW for the time being.

With orders that savings be made on materials, application was made once again to the Ministry, which approved the cable laying operations. In spite of the season, the application will be completed before the end of 1939.

On 24/11/1939, we communicated with the Felten et Guillaume Company, with whom we had an agreement, enquiring as to when their representative, who would monitor the cable laying and assemble the junction box, was planning to arrive here.

When the 35kW linking undersea cable is laid and operational, laying the remaining 10kW cabling between Tarabya and Beykoz will ensure secure electricity supply into the network on both sides of the Bosphorus.

With only a month left of this year, it is impossible to complete the laying operations of the two cables in question, so laying of the second one will be completed in 1940. Also to be completed in 1940 is the work of linking this cable to Transformer no. 580 between Serviburnu and Beykoz with an underground cable of approximately 2,500 metres in order to complete the Anatolian network.

Operation:

From the perspective of guaranteeing secure supplies of electricity to the Anatolian network, it was at first thought to lay the 35kW cable while the existing 10kW cable continued in operation. However, a number of factors made this a high-risk operation: the fact that the new cable would emerge on each shoreline at the same point as the existing one; as it would be laid along the same path on the seabed, it would be impossible in the fast-moving waters of the area to lay the new cable alongside the existing one without the risk of it collapsing onto the latter; the possibility of damage to the new cable during the subsequent removal of the old cable. Given the presence of these factors, a decision was made to lay the new cable only after removal of the existing one.

By means of the Karaca Ahmet transformer station, the existing cable provides electricity to much of the Anatolian side of the city. Hence, the loss of electrical current from this cable will mean that this area of the city will have to be supplied with electricity from Vaniköy. In this case, if there should arise any significant top-down tension, the recent renovations and installation of new power lines at Karaca Ahmet are sufficient to deal with it.

Once we have been informed of the arrival date of the expert from *Felten et Guillame*, operations to lay the new cable will begin. As outlined above, this will be laid after the existing 10kW cable has been removed. The 10kW cable will be transported to the Silahtarağa for temporary storage.

The 35,000volt, 3x50mm^2 cable to be laid between Sarayburnu and Salacak is made up of two sections of 800m and 1600m in length.

The 800m section is currently at the Silahtarağa facility. Its gross weight is 25 tons.

The 1,600m section is currently in storage at Salıpazar, on the dock. Its gross weight is 50 tons.

In order to lay these cables using the lighter at hand, it is necessary to remove the cable drums and winch currently in place on its deck, and place the cable drums referred to above on deck in the

required positions, as shown in the attached sketch. Hence, only one winch remains, that for the steel cable that will steer/guide the lighter during the cable laying process.

Given that this cable laying operation will take place where the Bosphorus waters are deepest, their currents strongest and the sea traffic at its busiest, it is best to navigate these waters as quickly as possible and on reaching relatively calmer waters near to shore assemble and then lay the junction box. In order to do this, once the 1,600m cable has been laid from the Sarayburnu shoreline, its end will be securely attached to the lighter. The empty cable drum will be lifted off the lighter by means of a crane hired from the Port Authority, and be replaced by the lighter's own hand-operated winch, removed at the start of operations. This will then be used to manouevre the assembled junction box into the sea.

With the junction box in position, drawing off cabling from the second cable drum will begin.

The large diameter (4m) of the cable drum holding the 1,600m cable means that from its position on deck, it will release the cable at an angle steeper than that of the smaller cable drums used to feed undersea cables into the water. Therefore,it will be necessary to construct and put in place a smaller mobile guiding cable drum to control movement of the cable and ensure that it is at the correct level and moving in the correct direction as it being fed into the water.

Because of the width of the cable drums, there is insufficient free space remaining on either side on the deck of the lighter for sprocket wheels, as used during repairs, to be attached to the sides of the drums. Therefore, there will be one brake disk/brake band installed on each side of the drums to help in controlling how the cable is reeled off the cable drum.

If operations could begin with the smaller cable drum instead of the larger one, there would be no need for a separate guiding drum to be installed because once the cable was entirely reeled off the smaller cable drum, the drum's empty central section could serve as the guiding drum for the cable being reeled off from the bottom the larger drum. However, since positioning of both cable drums on the lighter necessitated removal of the various available winches, there would then be no space available on deck for winches needed for the manoeuvres involved in assembling the junction box and releasing it into the sea prior to beginning cable laying from the large cable drum. Hence, plans to begin laying operations from the smaller cable drum had to be abandoned.

I hereby give my approval and permission for the cabling operations in question to be carried out in the manner explained above.

Head of the Technical Department

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Summary of the 3x50 mm^2 35,000volt Undersea Cable Order

Order No. 7159. Year 1935, Amount 2,400 metres of cabling and 4 complete junction boxes

	No.	mm	Width	Net Weight Kg .	Gross Weight Kg.
One 1,600-metre cable drum	4039	4070	2270	42512	47172
One 800-metre cable drum	3321	3370	2270	21256	24056

Three of the transfers are insulated with oil paper, wrapped in a sheet of metallized paper, and enclosed in a lead sheet protected by two layers of bitumen paper. These three and one other transfer were received compressed together with jute stuffing filling any gaps between them. The total was wrapped in two layers of jute strips, each of which was spread with a layer of bitumen, and then covered with a lead sheath, a layer of bitumen and two layers of bitumen paper. All were protected by a sheet of bitumenised jute and galvanised jute, a sheet of asphalt with (Z) armature asphalt, 2 layers of jute, and a layer of asphalt and compound.

Insulation thickness between phases	9+9 mm
Lead insulation thickness between phases	9 mm
Thickness of lead sheath	2.5 mm
Height of armatures (Z)	6, - mm
Insulator strength, between each phase and between these and thel ead sheath	200 M Ω/km
Capacity between lead and a phase – others	0,21 Ω/ km Faz
Omic strength of a transfer 0,357 ohm/km. for 20 degrees	0,357 ohm/km.
Weight-bearing capacity of the underground cable	150 A.

Minimum flooring temperature	0 degrees
Diameter of the transfer	9.15 mm
Diameter of the transfer over the insulator	27.15 mm
Diameter of the transfer over the lead cover	32,2 mm
External diameter of the caple and armatüre wrapped in jute Cable meter	97 mm 26570 Kg/Km.

Results of measurements after laying of the Sarayburnu-Salacak cable:	Insulator strength between phases and lead sheath	3970-4640 m Ω/ km.
	Capacity between phases (all three) and lead sheath	0.197 Ω/ km

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