

ANALYSIS OF TRANSMISSION CAPACITY OF ZHOUSHAN-MAINLAND 110KV SUBMARINE CABLES

Mingxiang **WU**, Zhejiang Electric Power Test and Research Institute (ZEPTRI), (CHINA), wumx9105@sina.com.cn

ABSTRACT

The statistic analysis of line load of 110kV interconnection project between Zhoushan grid and mainland grid is presented in this paper. The periodic load method, the initial load method and the traditional rated load method are adopted for the calculation and analysis of cable emergency load. The results and proposal put forward in this paper can be referred as the technical basis for practical increasing capacity of interconnection lines, and can also serve as the reference for further increasing capacity of cables.

KEYWORDS

Zhoushan grid; interconnection cable; transmission capacity; emergency current

BACKGROUND INTRODUCTION

Zhoushan grid and mainland grid are connected by 110kV Jiangnan substation in Ningbo, 110kV Chengxi substation in Zhoushan, and two 110kV overhead lines (ie, Nancheng No.1926 line and Chengjiang No.1925 line). Nancheng No.1926 line was put into operation on June 23, 1999, and Chengjiang No.1925 line was put into operation on February 9, 2002. In June 2004, Chengjiang No.1925 line was separated to Chengda No.1927 line and Jiangfeng No.1925 line in Dafeng 110kV substation in Jintang. The sketch map of Zhoushan-mainland interconnection lines is shown as Figure 1.

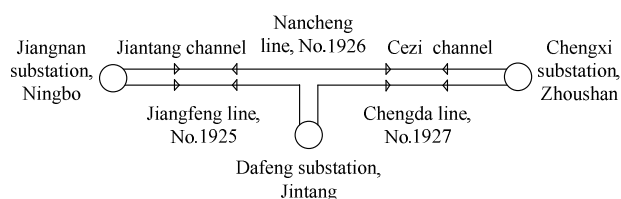


Fig. 1: Sketch map of Zhoushan-mainland interconnection lines

The total line length is 41.902km, of which the length of two submarine cables is 10.17km, and the length of overhead line is 31.732km. The length of overhead line in Ningbo is 7.168km, the length of submarine cable in Zhoushan Jintang Channel is 5.2km, the length of overhead lines in Jintang is 9.769km, the length of submarine cable in Cezi channel is 4.97km, the length of overhead lines on Yanggong mountain is 1.943km, the length of overhead lines on Huangmang mountain is 0.315km, and the length of overhead line in Zhoushan island is 12.537km.

Nancheng No.1926 line, Chengda No.1927 line and Jiangfeng No.1925 line are double-circuit lines, of which tower No.1 to No.38 are erected with Jiangfeng No.1925 line, tower No.40 to No.90 are erected with Chengda No.1927 line. There are total 90 towers. The model of overhead line is LGJ-300/50 (excepting transmission line

between Yanggong mountain and Huangmang mountain with a model of LGJ-400/50). The model of lightning wire is GJ-50 (excepting the section in Zhoushan with a model of GJ-70/40). The model of submarine cables laid in Jintang channel and Cezi channel is CYZQ241-110/300 single-core oil-filled cable. There are four terminal houses for submarine cables, which are Huangmang mountain, Dapukou, North Changsha, and Waidiao.

STATUS OF TRANSMISSION CAPACITY OF INTERCONNECTION LINES

The designed load of single circuit is 100MW for 110kV interconnection transmission line. According to the requirements of grid stability of and (n-1) principle, the allowable capacity transferred from Zhoushan to Ningbo through the 110kV double-circuit is 100MW, and that from Ningbo to Zhoushan is 60MW. In October 2006, a stability control system of Zhoushan grid was put into operation, then the allowable capacity transferred from Zhoushan to Ningbo through the 110kV double-circuit is 140MW in 2007, and that from Ningbo to Zhoushan is 100MW. The stability control system includes system splitting circuit overload control device in 110kV Chengxi substation in Zhoushan, system splitting circuit overload local cutting machine device in Zhoushan power plant, and signal transmission channel.

Table 1: Statistics of load over 100MW of Zhoushan-mainland 110kV double-circuit lines in 2007

No.	Date of peak load	Time of peak load	Load to Zhoushan (MW)	Load to mainland (MW)
1	2007.6.3	23:55	116.3	
2	2007.6.4	2:50	123.5	
3	2007.6.5	2:05	119	
4	2007.6.6	3:00	118	
5	2007.6.7	2:45	126.2	
6	2007.7.5	4:55	109.9	
7	2007.7.6	4:45	100.2	
8	2007.7.8	4:00	111.4	
9	2007.8.25	16:25	101.3	
10	2007.9.22	3:40		120.1
11	2007.9.25	9:05	100.4	
12	2007.9.26	14:15	101.5	
13	2007.9.27	9:35	107.6	
14	2007.9.28	10:25	106.9	
15	2007.10.5	9:40	100.9	

Table 1 shows the statistics of load over 100MW of Zhoushan-mainland 110kV double-circuit lines in 2007. It