A Case Study on Substation Load and Transmission Line Losses in 220kV Receiving Station

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Abstract— The substation is the heart of the power system. Growing demand of power can be fulfilled by establishing new substations. New substation is located near the load centers as far as possible to minimize the line losses. The substation electrical equipment should be in an efficient working condition to derive reliable and efficient operation, optimum utilization, reduced down time, minimizing revenue loss etc. Investigations of failure of equipments and taking preventive and corrective actions to avoid similar failures in future are the key to improvement.

Proper maintenance of substation equipment will ensure long life, trouble- free service and good quality power to the consumers. In this view, this paper gives the details of transmission loss in electrical substation under taken at 220/66KV receiving station, Davanagere.

Keywords— Power transformer, Transmission line, Feeders, Current transformers, Voltage transformers, Relays, Breakers.

1 INTRODUCTION

Karnataka Power Transmission Corporation Limited is a registered company under the Companies Act, 1956 was incorporated on 28-7-1999 and is a company wholly owned by the Government of Karnataka with an authorised share capital of Rs. 1000 crores. KPTCL was formed on 1-8-1999 by carving out the Transmission and Distribution functions of the erstwhile Karnataka Electricity Board.

Karnataka Power Transmission Corporation Limited is mainly vested with the functions of Transmission and Distribution of power in the entire State of Karnataka. It operates under a license issued by Karnataka Electricity Regulatory Commission. KPTCL purchases power from Karnataka Power Corporation Limited, which generates and operates major power generating projects in the state consisting of Hydel. Thermal and other sources. KPTCL purchases power from KPC at the rate fixed by the State Govt. from time to time.

The State of Karnataka, with availability of cheap electric power, and other infrastructure facilities, was conducive for increased tempo of industrial activity. It became necessary therefore, to augment power generating capacity by harnessing the entire potential of the Sharavathi Valley. The first unit of 89.1 MW was commissioned in 1964 and completed in 1977.

The generating capacity of the Shivasamudram Power House gradually increased to 42 MW in stages. To meet the increasing demand for power, the Shimsha Generating Station, with an installed capacity of 17.2 M.W, was commissioned in the year 1938. The power demand was ever on the increase, for industries and rural electrification, and additions to generating became imperative. The 1st stage of 48 MW and 2nd stage of 72 MW of the Mahatma Gandhi Hydro-Electric Station were commissioned during 1948 and 1952, respectively.

This paper presents a case study on substation load and transmission line losses in 220kV receiving station.

2 TRANSMISSION LINE

Electricity is a cornerstone on which the economy and the daily lives of our nation’s citizens depend. This essential commodity has no substitute. Unlike most commodities, electricity cannot easily be stored, so it must be produced at the same instant it is consumed. The electricity delivery system must be flexible enough, every second of the day and every day of the year, to accommodate the nation’s ever changing demand for electricity. There is growing evidence that both private and public action are urgently needed to ensure our transmission system will continue to meet the nation’s needs for reliable and affordable electricity in the 21st century.
3 RESULTS AND DISCUSSIONS

The total transmission losses of 220/66kv line are 3.19%. Station consumption and load per day for a month of July 2010 is shown below:

![Graph: Load(MW) versus Month (July)](image)

![Graph: Load (MW) versus Time (Hours)](image)

4 CONCLUSION

The power system establishing the substations near load centers makes it possible to supply quality and reliable power by the utilities at competitive prices by minimizing losses in the initial cost of transmission and distribution network.

The following aspects play a vital role in providing reliable and quality power to the consumers by the substations:

1. Establishing substations near the load center makes it possible to supply quality and reliable power by the utilities competitive prices by minimizing losses in transmission and distribution.

2. Proper design of substation and by the use of efficient equipment provides a high level of service continuity.
and flexibility of operation reducing the cost of operation and maintenance.
3. Planned maintenance schedule keeps the substation equipments in proper condition to provide efficient operation with reduced down time.
4. Selection of site plays a very important role in construction of substation.

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**REFERENCES**


**BIOGRAPHIES**

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