

DECLARATION

I, RAHUL SINGH (2K13/PSY/12) hereby declare that the work, which is being presented in the project report entitled, “**BLACKOUT SIMULATION OF POWER GRID**” submitted for partial fulfilment of the requirements for the award of the degree of Master of Technology (Power System) is an authentic record of my own work carried out under the guidance of Dr.S.T.NAGARAJAN, Associate Professor, EED, DTU. The matter embodied in the dissertation work has not been plagiarized from anywhere and the same has not been submitted for the award of any other degree or diploma in full or in part.

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CERTIFICATE

This is to certify that the thesis entitled, “**BLACKOUT SIMULATION OF POWER GRID**”, submitted by Mr. **RAHUL SINGH**, Roll No. 2K13/PSY/12, student of Master of Technology (Power System) in Electrical Engineering department from Delhi Technological University (Formerly Delhi College of Engineering), is a dissertation work carried out by her under my guidance during session 2014-2015 towards the partial fulfilment of the requirements for the award of degree of Master of Technology in Power System.

The uniqueness of the thesis pertains to a effort in understanding and simulation of cascade effect of power system components and controls leading to blackout of power system, which has not been reported elsewhere.

I wish her all the best in his endeavours.

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ABSTRACT

Grid failure also known as Blackout in power system is the worst situation in the operation of power grids. Several instances of grid failure have been reported from different parts of the world. Hefty economic loss in addition of paralysis of power dependent activities results due to grid failure and it may take hours to days to restore normalcy. Hence there is always a necessity to save the power grid from failures.

Even though corrective mechanisms and techniques have been suggested after blackouts each time the reason for failures differ. Therefore a benchmark or prototype system needs to be developed so that grid failure can be simulated in advance and various corrective mechanisms can be tested. This thesis aims to develop a small prototype or benchmark model for simulation of blackouts in power system. The study gives brief description about the types of Power Outages. The various causes and factors responsible for these type of disturbances with various protection schemes are discussed in details. It also contains a list of the major blackouts held all over world which gives us precious information by taking care of which we can avoid further power outage in our power systems.

For better understanding a case study is discussed which results as a biggest blackout among the world. Brief description about the factors responsible for both the events and the sequence of disturbances are also discussed. A simplified simulation model was developed with DIgSILENT Power Factory software to reproduce the grid behaviour when the blackout occurred. A load flow characteristics and transients analysis of power outage phenomenon of an similar Indian grid model, is studied and analysed to observe that how the whole grid is collapsed due to single fault. A brief description about the software used is also being shared in this report.

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