

Indexes of Area Operation Centers (AOC) Optimal Allocation in Power Network

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Abstract-Dispatching centers are regarded as the heart of the integrated network both in generation and transmission network and play an important role in safe and stable operation and also have a great importance observing economical usages. Basically stepwise dispatching system is corresponding to electrical network structures and the ministry of power management methods, and also has to be more flexible with future operation methods and able to coordinate with future ministry of power structures. In this paper, important hints and tips to improve dispatching situation, is presented besides clarifying indexes to find the optimum number and location of area operation dispatching centers (AOC). One of the most important indexes was examined in Iran network.

Keywords-Area Operation Center (AOC), dispatching, index, number of AOC, optimal allocation, power system control

I. INTRODUCTION

The electric power passes various processes from generation area to consumption area when running through meshed integrated network. Regarding the recent shapes and structures of electrical network in Iran, this process is followed as [1-4]:

- Generation network (vapor, water, gas power plant and combine cycle)
- Transmission network (400,230kV)
- Super distribution network (63, some 132kV)
- Distribution network (33, 20, 11kV)
- Low voltage distribution network (400,230V)

Due to different voltage level, each mentioned network is controlled and performance by different managed centers, although two or more of these centers might be observed by a unit company [5].

The basic and natural structure of integrated power electric network is such that the power generation sources and load centers are normally kilometers apart from each other, and the power system has expanded in a big and vast geographical area, which could be a country or sometimes many adjacent countries. Economical and stable operation of this vast network requires gathering and processing data in a control center and making appropriate commands to the system equipments. This kind of control center is called dispatching center. Since dispatching centers should control a network with hierarchical structure, so it must be compatible with the network. Therefore the dispatching center also should have hierarchical structure [6].

One of the major factors in dispatching and communication power industry is the updating speed and the accuracy of received data in dispatching centers, which is seriously influenced by related communication protocol among dispatching centers and terminals [7-8].

Remote transmission of information has always had the problem of limitation in transmission channel and sometimes lack of speed, and therefore is one of the major obsessions for protocol designers is the algorithm and the way of sending information and the type of communication system for data transmission [9].

So, by changing the new protocol in new dispatching system compared with old ones and also improvements in communications has tried to solve or reduce the latter obstacle, but on the other hand, variability of network and the huge amount of information and the high speed needed for transfer and data process and above all the existence of only one section responsible for observing and controlling data, still makes it difficult.

The nature of integrated network sometimes causes that event occurrence in a part of the network affects on system operation and even influences its security. Therefore in the condition that availability is rare due to the distance, necessity to analysis the information in order to control such problems is inevitable.

Due to lack of information in this field, this paper is based on the earlier experiences in Iran and reviewing the main relevant references. Regarding what was mentioned above the aim in this paper is to produce a dispatching system in order to reduce the amount of work in a single unit, and thus being able to control one area without the existence of a main headquarter. Since there is no reference for determining the number and location for Area Operation Centers (AOC's).

In this paper presents the major indexes for site placement of AOC's in power network. The indexes are introduces according to experience of authors in II.

II. INDEXES FOR OPTIMAL PLACEMENT OF AOC's

This paper is concerned with regional dispatching areas as second level of dispatching centers and investigates the needed criteria in a region power network which make these areas as an AOC. On the other hand, the possibility of AOC