

Dt Health Report A Diagnostic Tool -Identification of Transmission & Distribution Losses

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Abstract

Generally a distribution utility is struggling to optimize the numerous distribution transformers in their distribution system. Presently, the power distribution utilities like UHBVN, DHVBN, Haryana and other states like Utter Pradesh calculates the TD losses based on the 11KV feeder. However, 11KV feeder serves a larger area approximately 10-30 transformers of population. But whereas these TD loss reports based on the 11kv feeder are not crucial for finding the TD losses for a particular area as well as for the protection of distribution transformer failure. Because now a days many distribution utilities are not using distribution transformer meter individually yet. Now a comprehensive study is proposed to undertake work to meet the objectives. This paper deals with presenting a new method for identification of transmission distribution losses in the electrical power distribution system using DT health report named as A Diagnostic Tool. So, a computational MatLab based program is developed as software for preparation of DT health reports.

Index terms— Distribution Transformer (DT), Distribution Transformer Meter (DT meter), Common meter reading instruments (CMRI),

1 INTRODUCTION

knowledge of the reliability of transformers and other electrical equipment is an important consideration in the power distribution system. To evaluate the reliability of a distribution utility, it is necessary to have accurate reliability data on distribution transformers [1]. The quality of supply of electricity and data can be measured by installing DT meters individually on distribution transformers in the network and also by collecting and analyzing the meter read data of the network, But many utilities, such as UHBVN, Haryana and other states like Utter Pradesh are not using these type of DT meters yet. So they are often facing the problem of DT failure till now. Power distribution utilities Like UHBVN, Haryana most of DTs are burnt due to overloading, under loading and phase unbalancing, because of unavailability of data for protection of distribution transformer and maintain the

Author ? ? : Department of Electrical Engineering, D.C.R Univ. of Science and Technology, Murthal same, which can be taken only from the DT meter of distribution transformer. Proper utilization of information is not an easy task. The important task that remains is an effective analysis to obtain information that will assist in decision making. Distribution transformer management information system report offers rich, specialized functionality which is of great help to the power distribution utilities to meet their information needs. It includes the operational & performance parameters of distribution transformer are analyzed from DT meter reading. This solution provides an excellent, user-friendly interface to document and view elements like substation, feeder and distribution transformer and associated metering point. Supply of quality and reliability is the key analysis module of this solution.

2 II.

3 THEORETICAL BACKGROUND a) Distribution Transformer

Distribution transformer is costly and critical equipment in electricity distribution network. Their outages due to failure causes immense inconvenience in the network management and involve high expenditure on account of repair/replacement. Any distribution utility therefore takes all possible actions to reduce downtime/failure of transformers to a minimum and to enlarge their lives, at the most economic cost [2]. Distribution transformer is a static electric device which steps down the 11 KV (primary) voltage to 440 volts between phase and 230 volts between phase and neutral (secondary) through star-delta winding by electromagnetic induction which feeds different types of load such as domestic, commercial, agriculture and industrial etc. hence distribution transformer for the form the essential link between power quality and large number of consumers [3]. So the DT meter should be used to monitor various critical condition of Distribution Transformer.

4 b) Distribution Transformer Meter

The DT meter and distribution transformer are an important elements of electrical network involved in the energy distribution and thus in the energy audit of electricity distribution. Figure 1

5 ANALYSIS AND IMPLEMENTATION

Analysis can be well understood from the flow chart as illustrated in Fig. 3. The data obtained from DT meter is to be uploaded with the help of CMRI and also dump the same to the computer system. Further it is converted into Correct & Corrupt data form as a .CSV file. If there is any exceptional data found the process follows the path 'YES' and sent again for re-reading of DT meter. If there is no exception on ambiguity, the process attains the path 'NO'. It means the data is uploaded in the software tool for generation of DT health report. Figure ?? shows the cyclic representation of energy auditing is divided into five steps as: DT metering.

? Collection of meter read data with the help of CMRI. ? Analysis and calculation with the help of software Tool. ? Generation of DT health reports. ? Take corrective actions on behalf of DT health report which is the part of an energy auditing.

? Half hourly logging of KWH c)

Figure ?? : Cyclic representation of energy auditing

Figure 5 shows the schematic diagram of overall solution scheme of DT health report. As per the previous practice a proposed technique has been implemented as diagnostic tool ensuring that the fulfillment of requirements for the protection distribution system. Various information parameters in the form of reports are generated with a month-on-month trend of the progress of a distribution system.

6 IV. GENERATION OF DT HEALTH REPORTS a) Meter read data of various meter of respective division

The raw data such as active power (phasewise), reactive power (phase-wise) and voltage (phasewise) as shown in Table ?? is meters with the help of CMRI. This raw data is to be used for getting the necessary information about distribution transformer individually. Thus, further this information acts as input for the diagnostic tool for finding various necessary parameters as shown in figure 5.

7 b) A diagnostic tool

In which various parameters calculate with the help of software based tool in the form of DT health report. This software has been implemented in MatLab. Now, further this DT health report plays an important role in identification of the various losses of distribution system such as T&D losses with the help of eq. (??), which is very important task for making a distribution system to be healthy and protected.

8 RESULTS

The input data have taken from Nehru Place, BSES Power Rajdhani limited, Delhi, of one DT meter named as M-134 GK having serial no.19503122 day long as shown in Table ?. Similarly the whole data have taken for a month long of ten meters, i.e. ten distribution transformers as shown in the figure ??, for making DT health report. As discussed earlier, DT meter logging the data half hourly clearly shown in Table ?. After carrying out the DT health reports of distribution transformer it can be visualized that it displays the various parameters which are to be encircled i.e. DT energy, power factor, voltage, current on each phase, neutral current, peak KVA etc. as shown in figure ?? and exhibits the loading conditions which are the necessary parameter for fulfillment of DT Health reports which is further used for identification of T&D and AT&C losses. So it can be intimated that a DT health report is for better for identification of T&D and AT&C losses then that of older one i.e. 11 KV feeder losses reports. That's why the protection of Distribution transformer is easy to handle and maintain the same. Figure ?? & 7 shows the output results of DT health report of ten distribution transformer. Figure

?? shows the output response of demand curve (KW) vs time. Figure ?? shows the load curve (KVA) vs time and Figure 10 shows the neutral current vs time. These graphs as shown in figure ??

9 CONCLUSION & FUTURE SCOPE

From the survey of distribution utilities like UHBVN & DHBVN we found that the main reason for distribution transformer failure is overloading, under loading and phase unbalancing even then they are calculating the T&D losses based on 11KV feeder which are not helpful for maintaining the protection of transformers. So, for handle these type of situations we generates a DT health report with the help of MatLab based software program which gives the information parameters such as under loading, overloading, phase unbalancing as shown in Fig. 5 and also gives the consumption DT energy for calculating the T&D losses of a specific area and protection of the transformers.

The study on the DT health report revealed that additional information is needed than that information found in the reward of the failure reports. Some of the additional information is the following:-

? DT energy demand of respective mouth.

? Highest phase current with phase name ? Overloading condition/ period of overloading The internal failure rate of DT is very high; nevertheless, it is believed that the classification on failure rate in the actual health report was not clearly classified and distinct. Based on the data recorded reliability results shown very acceptable. It reveals that DT meters should be installed on distribution transformer individually instead of one 11KV feeder .This DT health report can also be generated for many transformers collectively and then integrated with the consumer database for getting the information about T&D as well as AT&C losses directly for the protection of distribution transformer with the help of soft computing technique.

10 APPENDIX



Figure 1: ?

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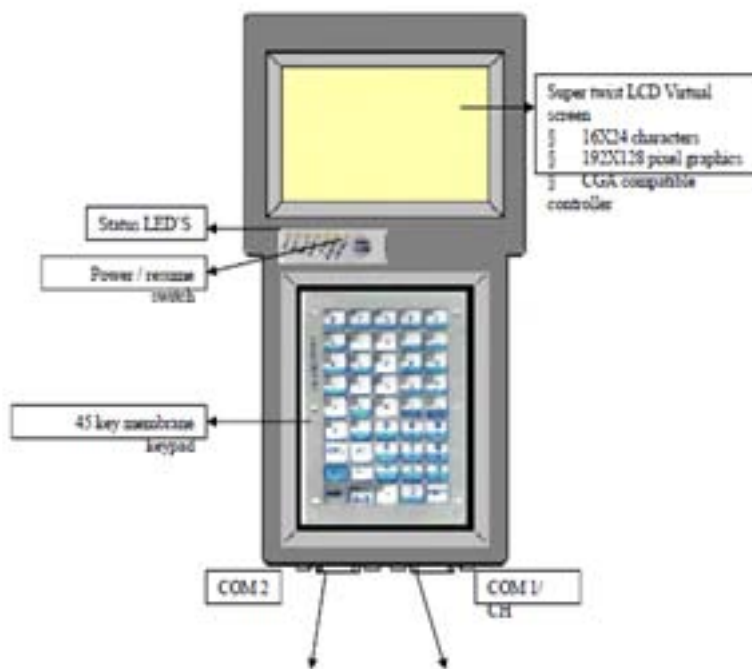
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Figure 2: Figure 1 :



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Figure 3: Figure 2 :

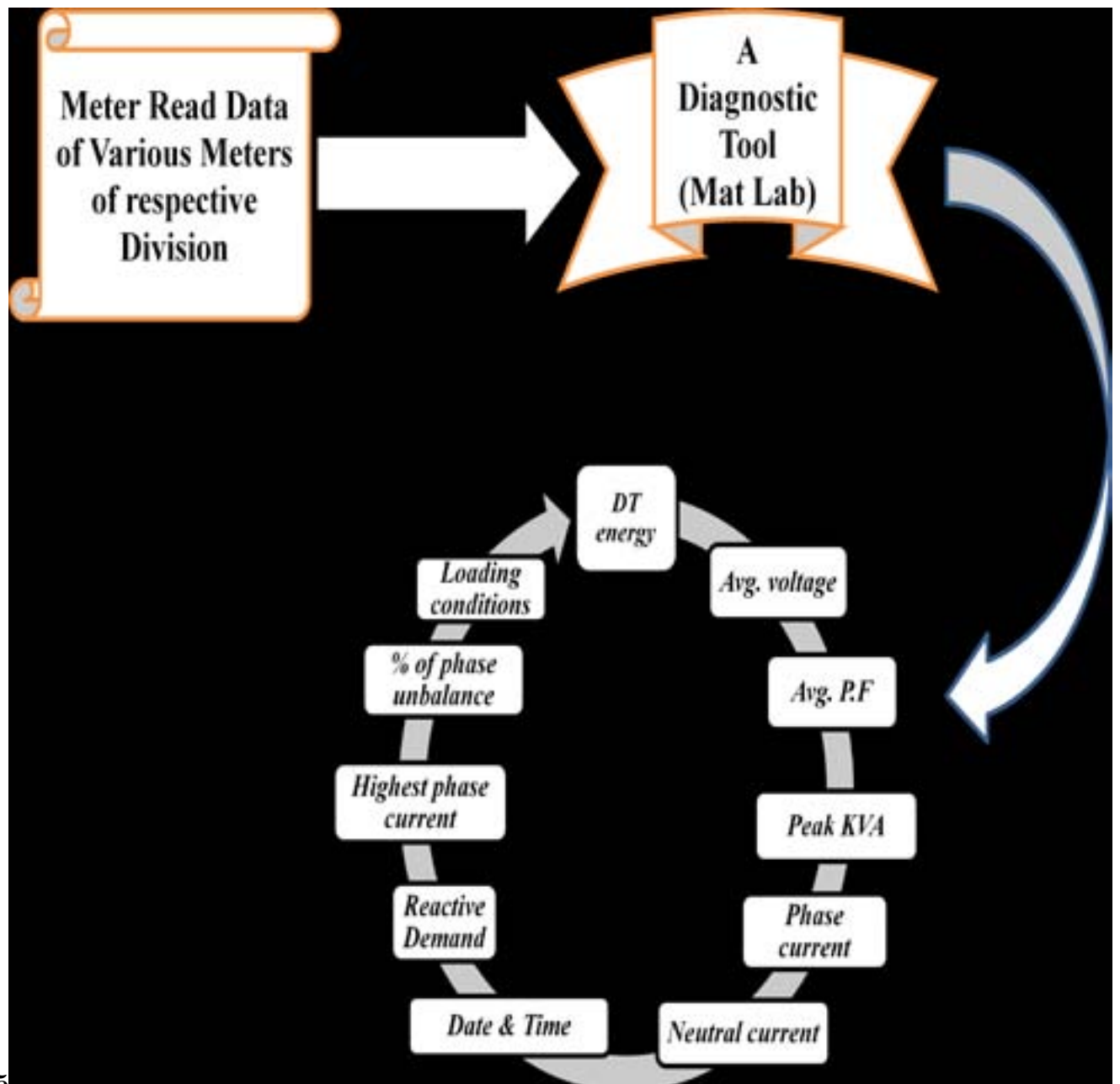
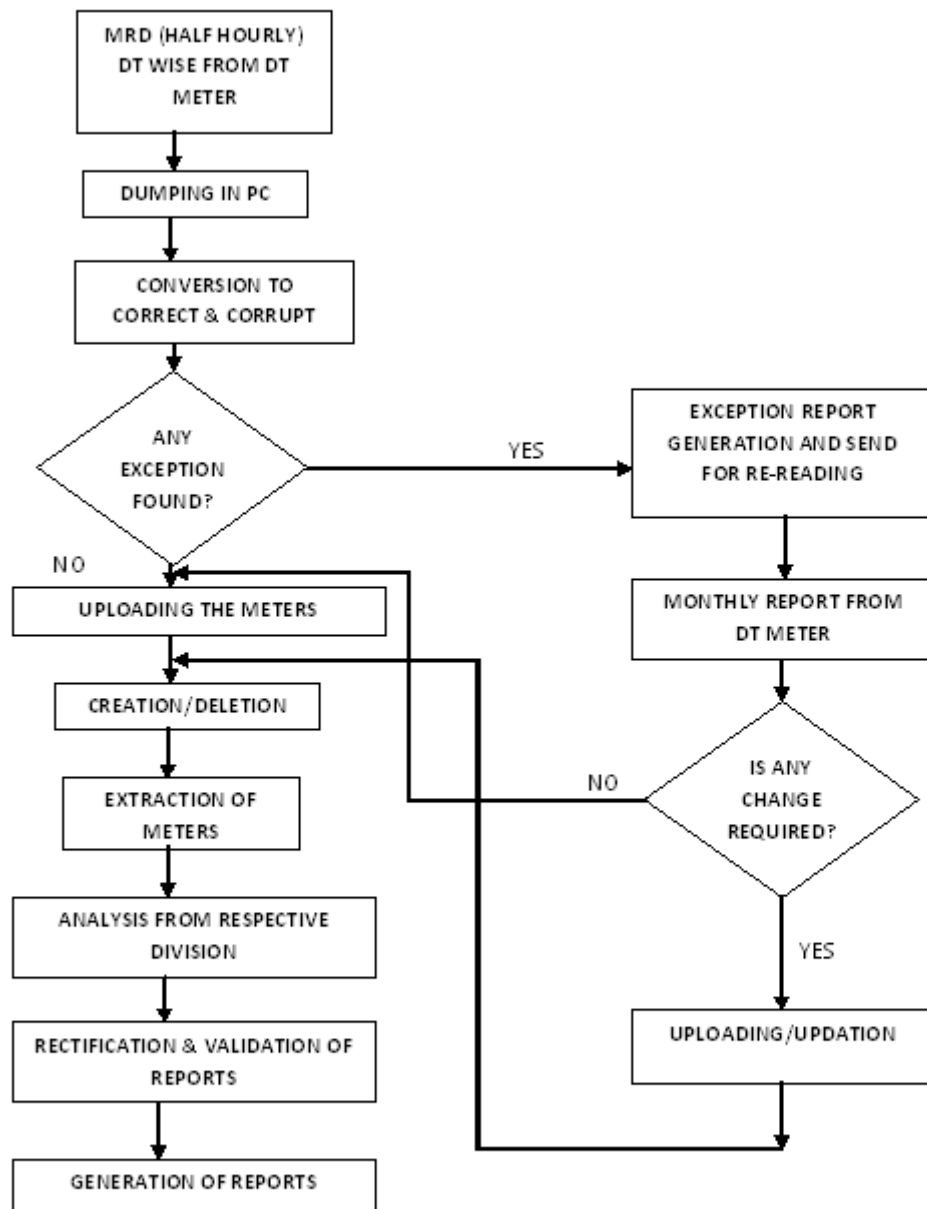


Figure 4: Figure 5 :



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Figure 5: Figure 3 :



Figure 6:

Figure 7: Figure 7 :AugustFigure 8 :

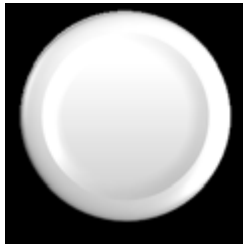


Figure 8:

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Figure 9: Table 1 .

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Figure 10: Table 1 :

[Mau Teng] , Au Mau Teng .

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