(contd. from page 2)

Transformer and Transformer Feeder Protection

phase voltage. The range of fault current magnitude for such a winding is therefore less than for a star winding. The actual value of the fault current will still depend on the way the system is earthed. It should also be remembered that the impedance of a delta winding is particularly high to fault currents flowing to a centrally placed fault on one leg. The impedance can be expected to be between 25% and 50% based on the transformer rating, regardless of the normal balanced through-current impedance. As the prefault voltage to earth at this point is half the normal phase voltage, the earth fault current may be no more than the rated current or less than this value if the source or system impedance is appreciable. The current will flow to the fault from each side through the two half windings, and will be divided between the two phases of the system. The individual phase currents may therefore relatively low, a fact which must be remembered when considering the performance of a protection scheme.

(to be contd.)

NEXT MONTHLY MEETING

Date : **Saturday, 14th January 2012**
Time : **04.00 p.m.**
Venue : **HOTEL HIGHWAY GARDEN Ernakulam**
Agenda : **Silent Prayer**
Welcome
New Year Celebration
Normal Business Session

All members are requested to attend the meeting

New Year Family Meet 2012

Our New Year Celebration is on 14.01.2012 at Hotel Highway Garden, opposite to Obron Mall, Edappally-Vyttila Byepass from 4.00 p.m. onwards. All are requested to participate in the event with family members.

Happy New Year

Members are requested to give the articles to the Power Scene to the Editor or the Area Representatives, Articles from family members are most welcomed. Articles may be e-mailed to jinskd@yahoo.in

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THE ERNAKULAM

POWER SCENE

MONTHLY NEWSLETTER OF THE KSEB ENGINEERS' ASSOCIATION, ERNAKULAM UNIT

Vol. X Issue : 95 January 2012 Ernakulam For Private Circulation Only

Sri. Aaryadan Mohammed, Hon'ble Minister for Electricity inaugurating the concluding session of 'Energy Conservation Day' celebration conducted by KSEBEA at Model Engineering College, Ernakulam

Chairman Speaks

Dear friends,

The energy conservation programme conducted at Model engineering College on 15-12-11 was a grand success. Congratulations to the organisers. I may take this opportunity to thank all concerned including the Principal, staff and students of MEC. The students has proved that they can do wonder if properly guided. Let this be a starting point for the good industry - institution relation.

We are getting together on 14-01-12 to celebrate the New year as per the schedule elsewhere in this publication. All are cordially invited with family to the get together.

The much awaited pay revision order has been released but the Audit circular is pending let us hope it will be through without delay.

I may welcome the new members joined to Ernakulam unit and those who have returned on transfer.

The diary 2012 and calender are ready with the local representatives, those who are yet to receive it may please contact the area representatives.

Wish you all a happy and prosperous New Year.

Thank you

M. E. Varghese

Edited, Printed and Published by Er: Jins K.D. for and on behaf of KSEB Engineers' Association, Ernakulam

Transformer and Transformer Feeder Protection

The Power transformer is one of the most important links in a power transmission and distribution system. It also possesses a wide range of characteristics and certain special features which make complete protection difficult.

These conditions must be reviewed before the detailed application of the protection is considered.

The choice of a suitable protection is also governed by economic considerations. Although this factor is no unique to power transformers, it is brought into prominence by the wide range of transformer ratings used in the transmission and distribution systems which can vary from a few kVA up to several hundred MVA. Only the simplest protection, such as fuses, can be justified for the lower ratings, whereas those of the highest ratings should have the best protection that can be designed.

Nature and effects of Transformer faults.

A fault on a transformer winding is controlled in magnitude not only by the source and neutral earthing impedance but also by the leakage reactance of the transformer and the fact that the fault voltage may differ from the system voltage according to the position of the fault in the winding. Several distinct cases arise; these are examined below.

A. Star connected winding with neutral point earthed through an impedance.

An earth fault on such a winding will give rise to a current which is dependent on the value of the earthing impedance and is also proportional to the distance of the fault from the neutral point, since the fault voltage will be directly proportional to this distance.

The ratio of transformation between the primary winding and the short circuited turns also varies with the position of the fault, so that the current which flows into the transformer primary terminals will be in proportion to the square of the fraction of the winding which is short-circuited.

B. Star-connected winding with neutral point solidly earthed.

The fault current in this case is controlled mainly by the leakage reactance of the winding , which varies in a complex manner with the position of the fault. The variable fault point voltage is also an important factor as in the case of the impedance earthing, but the reactance decreases so rapidly for points approaching the neutral that the fault current is actually highest for a fault near the neutral end of the winding.

The fault current is modified as before by the variable transformation ratio to give the input current. As the fault current magnitude stays

High throughout the winding and since the general scale of the current is high in the absence of the external limiting impedance, the input current remains at a substantial level for faults at most points along the winding.

C. Delta-connected winding.

No part of delta-connected winding operates with a voltage to earth of less than 50% of the

(contd. on page 4)

Energy Conservation Day Celebrations at MEC, Erankulam