

Roster, and it means funds. But the expense in maintenance and its continuation are very little as compared with other projects undertaken to conserve our national resources. The Roster will be of value to many constructive activities of the nation; such as (a) the effective use of the scientific talent available in the country, (b) to reveal the gaps in the present unco-ordinated growth of science and technology, (c) to help proper equipment of College faculties, (d) to supply service personnel to industries, (e) to suggest alternative names where

team-work is likely to be broken up, (f) to safeguard going concerns like education and research by conservation of present personnel and to stop the drift of scientific and technical men to purely administrative lines.

It seems evident, therefore, that in times of war as well as peace, a central list of this sort will be a National Asset for the effective use of its Scientific and Technical man-power. It is up to the Scientists and Technologists in India to render all help towards an early compilation of the National Roster.

RESUMÉ ON SERIES CAPACITORS

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THE American transmission and distribution system during the war had to be loaded to its more than maximum capacity calling on the resources of the engineers resulting in notable strides of improvement in the construction and protection of power capacitors to meet the exigency. However, in India, during that period, when imports were restricted and hence no further additions of plant were feasible, the exploring of raising of the capacity of the existing system was hardly given any attention and power was denied to many industries some of which could have been supplied power and gone a long way in the industrialisation of the country which we are all seeking to-day. Furthermore, heavy voltage drops could have been avoided and helped in the current to be delivered at an optimum voltage to all the consumers connected to the power system. In this respect the response of capacitors connected in series with the lines, otherwise called Series Capacitors is highly interesting.

Improvement in voltage regulation can be effected in several ways. The method of transmitting more power at higher voltages through larger wires or more number of parallel lines will involve higher cost of line construction and transformers and a corresponding increase in operating cost. Moreover, very little voltage regulation will be obtained by increasing the size of conductors beyond a certain limit because the controlling factor is chiefly the inductive reactance of the line. Induction regulators common now on rural lines have high internal losses and are not instantaneous in action. A change of voltage is necessary to actuate them and a time factor is involved to effect the correction. It might so happen that by the time correction is effected the demand for excess current has ceased and an overvoltage results. Synchronous Condensers for voltage regulation, in large vogue at present, have losses varying from about one and a half per cent. of their rating on very large sizes to about five per cent. of their rating on smaller sizes and the machines with their control equipment are complicated and require periodic inspection and proper maintenance. The Shunt Capacitors like synchronous condensers improve voltage regulation by improving power factor. If they are left on circuits at light loads a voltage rise will occur at the distribution points which may be as disadvantageous as too low a voltage. Series Capacitors provide automatic voltage

regulation from light load to full load changes in the circuit. They also tend to lessen the initial cost of a new circuit by making possible the use of a smaller size of wire for a given power with a given voltage drop. The reactance of a system has a predominant effect on the maximum power that could be conveyed over a line. It should be kept as low as possible and the method by which it could be reduced to a minimum is to alter the spacing which is, of course, governed by voltage, corona and mechanical considerations. The series capacitors nullify the inductive reactance of the line and transformers and it approximates the line to characteristics of direct current transmission. Their use enables the existing system to carry greater load than what could be handled by increasing the wire size.

It is common experience that due to reduced voltage induction motors sometimes start slowly or refuse to start through the action of the undervoltage device. Fluctuating, intermittent and suddenly applied loads such as, the working of the rolling mills, resistance welding machines impose difficult load conditions on the power system from the standpoint of feeder regulation and capacity. It is felt that these types of applications have a great future in our country since the use of electricity is playing a larger and larger part in welding, etc. From the economics point of view the power company cannot cater to such needs. Herein the series capacitors are of considerable advantage to other types of equipment for providing automatic voltage regulation.

The series capacitors have recently been used with success in improving the regulation of high frequency generators to supply power to induction furnaces. These generators are single phase, and the very nature of their design indicates that they have high reactance which causes very poor regulation.

On high voltage long transmission lines the series capacitors can be used to increase the stability limit of the circuits in which they are connected. They also find application in improving load division by alteration of the impedance of parallel circuits.

The series capacitors also excel other commercial apparatus in their characteristics of low losses which are of the order of 0.25 per cent. of their rating. Being static and sealed-off devices they require practically no maintenance or attendance; nor any specially prepared

foundations are needed for their installation. The series capacitors thus provide a broad field of service in power systems and may well be given thought to in the proposed network of transmission and distribution lines in India.

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PROFESSION OF CHEMISTRY IN INDIA *

PROF. FINDLAY said that he had been sent by the Royal Institute of Chemistry to convey their greetings to their members in the Indian Dominion and to consult the Indian colleagues as to the best way in which the Fellows of the Royal Institute of Chemistry here in India could build up a strong professional body like that of the parent body in Great Britain.

The Royal Institute of Chemistry, he continued, came into being 71 years ago as a result of the pressing demands of an Act in Great Britain called "The Food and Drugs Adulteration Act". At that time there was no standard of chemical competence in Great Britain which could fulfil the aims and objects of the "Food and Drugs Adulteration Act". When such was the state of affairs the Royal Institute of Chemistry was brought into being in order to (1) prescribe a standard of scientific competence for the profession of chemists; (2) see that the standard is maintained; (3) arrange for courses to produce chemists of the proper standard; (4) hold examinations in order to decide the eligibility for membership; and (5) safeguard the interests of chemists and chemical engineers in fixing their salaries in Government Departments, Factories and other concerns.

Professor Findlay then referred to the education of young men and women in Britain who were unable to attend the university for their education. He narrated the practice followed in Great Britain in this respect. Examinations were held and National Certificates were issued to the pupils. The examination papers would be approved by a competent body appointed jointly by the Education Ministry and the Royal Institute of Chemistry. According to them the Senior National Certificate is equivalent to a B.Sc. degree. Those candidates who attained necessary efficiency, after about two years of approved work would be eligible for admission to the Royal Institute of Chemistry.

* Summary Report of an Address delivered by Prof Alexander Findlay, D.Sc., F.R.S., on 17th March 1948, at the Indian Institute of Science, Bangalore.

"At the present it is your intention," Professor Findlay said, "to build up new industries and to develop your old ones. Those of you who are qualified for the profession should organise a strong professional body and build up in India such a high standard for the membership that you could speak with authority as to what must be done in the best interests of the country. It will be found advisable to form local centres of your professional bodies where you could come together from time to time and discuss problems of paramount importance to the country and for safeguarding the interests of the profession of chemistry. The body should not work for the benefit of its members only. It should always bear in mind the public interest. When I landed in Bombay I suggested to my colleagues there to form the local centre and to make use of the machinery available in Great Britain. Since you have been conferring D.Sc. and Ph.D. degrees in almost all the universities, there will be no difficulty for you to fix up the standard for this Certificate. There are about 100 members of the Institute of Chemistry in India; and I have been sent here to offer to you on behalf of the Royal Institute, any assistance that you might need. Any suggestion which you have to make regarding simplification or alteration of the rules in order to meet the needs of this country will be welcomed. It has been agreed, for the present, to set up four branches of the Institute in India—at Bombay, Calcutta, Delhi and one in S. India. When these local centres have been established, I hope they will realise the importance of their duties in India and undertake to enrol for their professional body all the chemists qualified to become members. You can also maintain a register of qualified chemists.

"The whole plan should be in collaboration with the Ministry of Education in India. But for the full support and co-operation of this Ministry in Great Britain we would not have been able to build up the Institution to the status it now enjoys."