

Report of the IEEE IAS Kolkata Chapter for the year 2017

The Industry Applications (IAS) Kolkata Chapter arranged one administrative meeting and five technical lecture meetings in the year 2017. The details are as under:

- (i) **The administrative meeting:** This meeting was held on 10th March, 2017 to discuss the activities being undertaken and to be undertaken for the year 2017. After deliberations, it was resolved to arrange for around 5 to 6 technical lecture meetings for the current year and to look into revamping of the website for the IEEE IAS Kolkata Chapter. It was also discussed that if possible, some technical lecture meetings be arranged in the engineering institutes in and around Kolkata in addition to places namely, Jadavpur University and Indian Institute of Engineering Science and Technology, Shibpur, for greater outreach. Seven IAS Kolkata chapter executive committee members attended the meeting.
- (ii) **The first technical lecture meeting:** This meeting was held on 1st April 2017 (3:30 pm to 4:30 pm) at the Seminar Hall, Department of Electrical Engineering, B. P. Poddar Institute of Management and Technology (Main Campus), Kolkata. The title of the lecture was “Carrier Based PWM Inverters: General Concepts” and it was delivered by Dr. Suvarun Dalapati, Assistant Professor, Department of Electrical Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, India. Starting from a general introduction on Pulse width modulation (PWM) inverter, carrier-based PWM techniques and carrier-free PWM techniques were discussed. Thereafter, the presentation focussed on the most popular version of carrier-based PWM technique – namely the Sine-PWM technique. Starting from the elementary idea of DC-AC conversion by the six-switch (two-level) inverter by using the square wave (180° mode) operation, the talk explained the basic essence of the Sine-PWM technique and discussed its advantages over the square wave mode of operation. Two principle drawbacks of the Sine-PWM technique – (a) the synchronization problem and (b) the DC bus utilization problem were also discussed. The lecture was attended by 53 people including 2 IEEE members.
- (iii) **The second technical lecture meeting:** This meeting was held on 12th April, 2017 (3:00 pm to 4:15 pm) at the Seminar Hall, Department of Electrical Engineering, Indian Institute of Engineering Science and Technology (IEST), Shibpur, Howrah. The title of the lecture was “Rolling Mill - Large Motors with Variable Speed Drive (VSD)” and it was delivered by Mr. Paritosh Chatterjee, Supdt. Engineer, M. N. Dastur & Co. (P) Ltd., Kolkata, India. This talk started with discussion on requirement of rolling mill drive from ‘process’ point of view, with special references to large power drives. Typical schematics of large drive system, categories of large motors, rolling mill large drive application followed - with a comparison between squirrel cage induction motor based drives and synchronous motor drives. Cooling circuits of large rolling mill motors and drives, control methodologies of large drives, applications were addressed. The lecture ended with a typical case study on a rolling mill drive. The lecture was attended by 46 people including 5 IEEE members.

- (iv) **The third technical lecture meeting:** This meeting was arranged on 7th July, 2017, (11.30 am to 1 pm), at the Seminar Hall, Department of Electrical Engineering, Indian Institute of Engineering Science and Technology (IEST), Shibpur, Howrah. The title of the lecture was “Role of Smart Buildings in the Development of a Smart City” and it was delivered by Professor Saifur Rahman, Joseph R. Loring Professor of Electrical and Computer Engineering, Virginia Tech, USA. The lecture started with a general introduction that the demand of electrical energy is increasing drastically and electricity consumed in small and medium sized buildings in India is growing at a high rate. Therefore, there would be a need for smart buildings or zero energy buildings. In India, most of the electrical equipment in small and medium sized buildings at present is operated manually in the sense that there is no automation for monitoring and control of air conditioning, plug loads and lighting systems. As a result, a lot of electrical energy is wasted. It is also observed that the power factor often drops below acceptable ranges with increasing inductive loads which causes circuit currents to reach unacceptable limits. BEMOSS (Building Energy Management Open Source Software) using ICT devices and integrated with renewable energy would provide a cost-effective solution for the aforesaid problem and would be helpful in the development of smart buildings and smart cities in India. The lecture then provided an in-depth understanding of the challenges and opportunities for energy efficient building operation and management. The lecture was attended by 52 people including 4 IEEE members.
- (v) **The fourth technical lecture meeting:** This meeting was arranged on 6th September, 2017, (4:00 pm - 5:00 pm), at the Seminar Hall, Department of Electrical Engineering, Indian Institute of Engineering Science and Technology (IEST), Shibpur, Howrah. The title of the lecture was “Permanent Magnet Direct Drive Generators: Scope of University Research” and it was delivered by Dr. Debmalya Banerjee, Research Engineer, Hella Electronics, Pune, India. The main objective of the presentation was to present different possibilities of university research areas for Direct Drive applications in wind power conversion. Specifically, the area of research on position sensor- less controller for high torque applications at near zero speed or low speed of Permanent Magnet Machines was discussed. The lecture was attended by 42 people including 4 IEEE members.
- (vi) **The fifth technical lecture meeting:** This meeting was arranged on 15th November, 2017 (2:00 pm - 5:00 pm), at the Seminar Hall, Department of Electrical Engineering, Indian Institute of Engineering Science and Technology (IEST), Shibpur, Howrah. The title of the lecture was “Design, selection and application of AC motors followed by some practical examples” and it was delivered by Mr. Sabyasachi Roy, Ex-Chief Manager (Technical), WEG Electric India (P) Ltd. India. The talk started with some discussions to have the audiences' views on the different parameters to be considered for design, selection and application of AC motors. It then addressed the most important parameters needed to be considered for designing the most suitable motor under a given situation. Hence, each and every such parameter was discussed in greater details with

importance understood. Importance of some important technical parameters to be ensured as per some of the Indian/International consultants' specifications was talked about. Discussions were made about how those parameters could be achieved. In the second part of the lecture, a brief discussion on IGBT based PWM inverters with their advantages were outlined. The issue of 'how inverter duty motor design is different from standard induction motor design and why' was addressed. The tangible and intangible benefits arising out of such special duty motors and drives were mentioned. A very practical example based demonstration for such motors and drives for COLD ROLLING MILL was taken up at the end. This lecture also enabled the audience to be able to perform such selection of motors for any other duty or application. The lecture was attended by 38 people including 5 IEEE members.