

A Power System Operator's Tribute to Power Systems

Guru Charles Concordia

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ABSTRACT

Charles Concordia, Guru of Power Systems, has left an indelible impression and a strong, lasting influence on academicians & practicing engineers alike. A tribute to the Guru has been attempted, quoting Concordia from his classical papers on Power System. David W. Knudsen, Senior Life Member, IEEE says, "A small comment about that magnificent man Charles Concordia. While doing an extensive literature search in 1969 in relation to my doctoral studies, I noticed that Charles Concordia had published at least one important paper every year for more than 30 years". Today with the increasing complexity of the power systems in India, there is a need for capacity building in the Power Sector and the observations of great engineers like Charles Concordia can be a very strong motivating and driving force. The following is a compilation of some remarkable views of the Great Guru from his renowned works.

"A Power system engineering is inherently multidisciplinary, in Concordia's view. It involves electrical, mechanical, hydraulic, and thermal phenomena, and ranges over such topics as sub-synchronous resonance and turbine blade vibration. 'We worry about all of these', he declared."

Typically during his consultations, the teacher takes over "... it is best to let the client understand it himself. I always ask [him] 'what computing equipment do you have available?' and then design the method of calculation to fit what he has," he said. "I don't want to [give] them the answer on a silver platter. I want them to calculate it by themselves." He added, "You have to have a reputation of not claiming credit ..."

Advice to the power engineer:

"Today most power work is not technical but focused on legal and political problems, the medalist pointed out. Often "... the degree we get in college has little to do with [it]," he said, and power engineers need legal knowledge."

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"It has been said that a successful democracy depends on an informed citizenry. Thus, the state should have the responsibility of providing enough education to ensure the literacy and basic knowledge of history and politics and economics, and a spirit of consideration and discipline, to all those who aspire to become voting citizens ..."

... The important principle is that everybody, rich as well as poor, brilliant as well as stupid, healthy as well as handicapped, should have equal opportunity provided by the State. In our zeal to aid those we regard as unfortunate, we should not neglect those who are the resources to the future"

"In a response to the question as to how much of their college education they themselves paid for many graduates have answered 100 percent. This shows a basic lack of understanding that might even be regarded as shocking. It indicates an acceptance of subsidies as a legitimate way of life in the future"

"Several years ago, some educators discovered something that most other people already knew, namely that one learned most rapidly the things in which one was interested. This led them to the conclusion that students should be taught those things in which they were interested, and that much effort should be made to arouse interest. But this misses the point that one of the most important and useful assets that we can have is the ability and the will to be able to study diligently subjects in which we are not interested. Even learning by rote should not be so utterly despised ..."

History and Reflections on the way things are
IEEE Power Engineering Review
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"Characteristics of a power system that have become of increased importance because of interconnection may be classified as:

- Very small damping of disturbances
- Need for more voltage support
- Much more complex in design, operation, control, protection, and analysis
- Controls, much more pervasive and numerous
- New problems"

"One might say that the whole point of power system interconnection is to assist in obtaining an adequate and reliable electric power supply in the most economical way by taking advantage of the opportunities for the economic interchange of energy and pooling of generating capacity. Considerations of feasibility, economy, geography, public relations, environment, politics, available resources, and probably others lead naturally to a distribution of generation rather different from the distribution of load"

"The present large power system is never designed as we should have designed it ab-initio for its present load. Instead, it has grown gradually, additions being continuously made while leaving much of the old system unchanged. The system is left with many voltage levels, sometimes in parallel paths, and with many generators connected at lower voltage levels. This puts constraints on the full utilization of all transmission capacity and above all makes protection much more difficult. It also sometimes leaves weak links in the system,