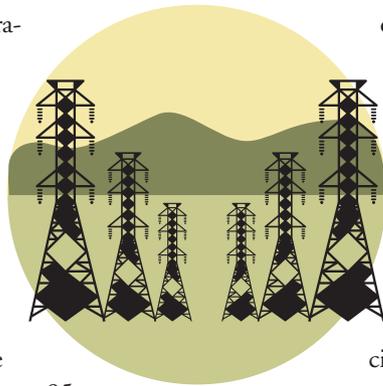


ENERGY ISSUES

After reading the article “Energy issue beckons P.Engs in new directions” by Michael Mastromatteo in the latest issue of *Engineering Dimensions* (January/February 2009, p. 28), I felt compelled to write on the issue of efficient electricity.

I must confess that I have not read the book *Asymmetric Operation of AC Power Transmission Systems* by Richard Marceau, PhD, P.Eng., Don McGillis and Abdou-R. Sana. But I take issue on the generalization made by the statement: “With the three-phase system, a fault or short-circuit on any one line takes the entire system out of operation. In effect, a flaw in one-third of the entire line automatically deprives the network of 100 per cent transmission on the same line” (p. 32).

It has been widely documented in Institute of Electronics and Electrical Engineers (IEEE) papers that most faults in electrical systems (some document 85 per cent, others up to 95 per cent) are single-phase-to-ground or begin as a single-phase-to-ground fault before developing into phase-to-phase faults or three-phase faults. Since the early 1950s, the adoption of high-resistance grounding in industrial three-phase power systems has become the way to increase the reliability of a power supply by reducing the damaging effects of excessive ground fault current, avoiding over-voltages inherent in arcing faults, and providing a safe and reliable way of locating a fault and selectively isolating it whenever convenient to maintain continuity in the power supply. Today, the use of a high-resistance grounding system has been successfully implemented in medium-voltage networks.



Some countries like Russia, Italy and China use compensated grounding systems (a more sophisticated “Peterson coil”) while others prefer isolated systems. In any case, such grounding methods, with a little bit more complication than with high-resistance grounding, allow them to sustain a single-phase-to-ground fault without instantaneously tripping until either the fault extinguishes itself or the faulted feeder is selectively tripped.

The statement may be true only for solidly grounded three-phase power systems, which are the norm in North America. However, isolated or compensated systems can withstand a single-phase fault without tripping the systems, making the statement false in those instances. Additionally, DC transmission systems are not only more efficient, but also more economical as the cost of power for electronic components decreases with an increased ability to use them at much higher voltages.

In my view, a compensated (HRG) medium-voltage generation network, with a DC converter for transmission, would eliminate the need for a three-phase transmission system. Such combination would be far more reliable than a traditional three-phase, solidly grounded transmission system, without the need of asymmetry, and with technology currently available and already tested and proven in the field.

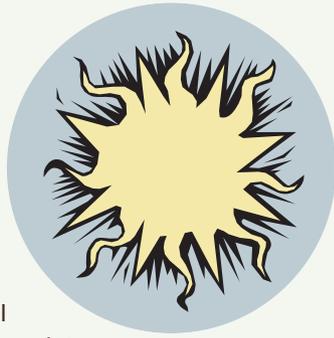
Alberto Quiroz, P.Eng., Toronto, ON

UNNECESSARY DISCIPLINE

I am a retired P.Eng., having been a member for many years and worked in the construction industry all across this wonderful country of ours. Quite frankly, I am embarrassed by our association for meddling in issues that are outside its mandate, especially in the issue about Mohamad Farooq, PhD. This has nothing to do with public safety, but more about character. The association has performed a service outside its scope and completed a discipline action that University X could or would not do itself. I question why PEO should even be dealing with personal conduct issues. The member was not conducting any public engineering work; there were no design errors. My ring, which I proudly wear, is to remind me of my responsibility to the public for safety and responsible engineering design. This issue should have been dealt with by the university, not by PEO.

I have noticed a disturbing trend over the last five years of the association dealing with small, petty issues, especially around the submission of drawings for building permits. I have talked to other engineers and found they, too, agree with me.

Dale Macdonald, P.Eng., Scarborough, ON



CLIMATE SCIENCE IMMATURE

Once again, it is the “usual suspects,” as I feel compelled to comment on a letter from Lee Norton, P.Eng. (“Accept proven science,” *Engineering Dimensions*, January/February 2009, p. 78) exhorting us to embrace “accepted science” vs. the implied bad science that forms the opinions of some engineers on the subject of human-caused climate change. He then proceeds with some “we know” items, where a person with more humility about human scientific endeavours would say, “some think.”

The ice core record of paleolithic atmospheric CO₂ concentrations may be somewhat suspect due to the included bubbles of trapped air not being closed systems (Jaworowski, Segalstad & Hisdal, 1992). In addition, the correlation of atmospheric CO₂ to temperature does mean causation, especially where the CO₂ concentration changes seem to lag temperature in the records.

While I understand that the radiative energy received by the Earth from the sun is fairly constant, Mr. Norton neglects to mention that there are other solar activity indicators, such as the solar wind strength and the solar geomagnetic AP index, which have large variances. The study of the sun’s effect on climate is in its infancy and nobody is making any hubristic claims as to the sun’s activity being a major driver of climate. On the other hand, would anybody be surprised if it is another suspect in climate variability?

As to the global dimming by aerosols in the atmosphere, the claim seems to be that it masks the true extent of CO₂-induced human-caused global warming. Maybe so, but it might just be masking global warming due to a natural cause, so I don’t see this as proof of anything.

The final “we know” alleges that “climate scientists have consistently underestimated the effects of global warming.” If climate scientists are deemed to be the highest authority on climate change, who are the fabulous “we know” super experts who have this special knowledge that normal climate experts do not have? And is Mr. Norton under the banner of “we” included amongst this elite group?

In my opinion (humble, I hope), the Earth’s climate is much too complex and the science too immature to make claims of understanding at this time. Mr. Norton has boarded the anthropomorphic climate change bus barreling along to who knows where, but some of us more wary folks choose to stay on the sidelines in case the wheels fall off.

Robert J. Austin, P.Eng., London, ON

IRON RING OATH

Two years ago, informative reporter Michael Mastromatteo invites debate: Does a 100-year-old disaster still have relevance for the engineering profession? What is symbolized by the engineer iron ring? (“After the fall—What the Quebec Bridge means today,” *Engineering Dimensions*, September/October 2007, p. 50).

The Quebec Bridge had two distinct collapses during construction: first, the south anchor and cantilever arms and four panels of the suspended span collapsed, with 75 worker deaths; and second, the replacement contractor dropped the centre span, with 13 worker deaths.

To the dismay of engineers and the public, these tragedies were repeated 50 years later in Vancouver for the Burrard Inlet crossing on collapse of the north anchor span, with the death of 17 workers plus one classmate.

No single element caused these failures, but they resulted from a collective failure of the engineer/owner/contractor team during construction. One unreported common element at each structure was:

1. the Quebec main pier was founded on 35 feet of unconsolidated sand, later constructed to bedrock; and
2. the Vancouver unstable erection grill was on pilings supported on unconsolidated river gravel, and later strengthened.

Regardless of statute regulation, prominent Canadian engineers set out to imbue members of our profession with their broader responsibility to society through the Rudyard Kipling oath, correlating engineers as individual links in a steel chain, forever reminded by an iron ring. Now, with the *Professional Engineers Act*, elected engineers with staff help must regulate licensed practices.

The profession, even with regulation, is losing sight of our oath. Many graduates are content to work only as learned technicians, and engineers have fallen behind in environmental protection, sustainability planning and socio-economic evolution of public and private works, despite efforts to redirect us by concerned ministries, including Environment, Labour and Municipal Affairs.

In overdue response, council’s ongoing regulation revolves around an additional academic year, with ongoing education; a licence in one or more fields or branches of practice; and regulating the academic syllabus for 30 fields of specialty engineering, sequestered from nine present academic disciplines.

The iron ring oath remains symbolic of our commitment to the profession and to our council for retaining and enhancing an evolving society.

Roy H. Fletcher, P.Eng., Etobicoke, ON

[LETTERS]



WHO'S RIGHT? WHO CARES?

Global warming, climate change, greenhouse gases, human-caused pollutants—it appears the latter two items are accepted as causing a negative impact. Regardless of which produces what, I know engineers like to be right. We ought to do all within our power, as human beings, to minimize any negative impact on the Earth from both of these.

M. Rosplesch, P.Eng., Ottawa, ON

Letters to the editor are welcomed, but should be kept to no more than 500 words, and are subject to editing. Publication is at the editor's discretion; unsigned letters will not be published. The ideas expressed do not necessarily reflect the opinions and policies of the association, nor does the association assume responsibility for the opinions expressed. All letters pertaining to a current PEO issue are also forwarded to the appropriate committee for information. Address letters to jcoombes@peo.on.ca.

CORRECTION

On page 25 of our September/October 2008 issue, we incorrectly identified Simir Chidiac, PhD, P.Eng., as the director of McMaster University's Centre for Effective Design of Structures.

Chidiac was the conference chair for the 2nd Canadian Conference on Effective Design of Structures, but A. Ghani Razaqpur, PhD, P.Eng., is the director of the centre.