

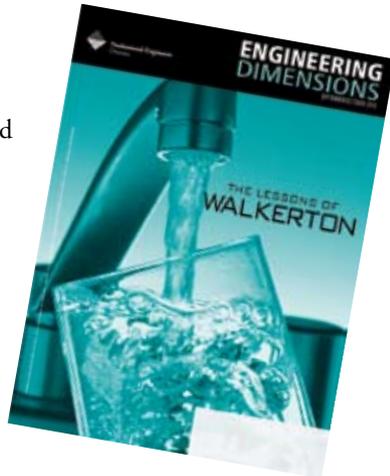
[LETTERS]

WALKERTON CULPRITS

The comments on the articles that have appeared in the press and in our magazine may have all overlooked some of the main culprits in this disaster (“Engineering profession still mulling over lessons of Walkerton,” *Engineering Dimensions*, September/

October 2010, p. 34). Anyone who has ever worked with, or for, municipal governments knows there is much to the saying, “It’s who you know and not what you know.” Many of the advertised job descriptions for positions are offered first internally, and even when going outside they are written specifically to eliminate anyone but the desired candidate. In my experience as a consultant, I have encountered such bizarre incidents as a chief building inspector who could not read blueprints, water and sewage plant operators who knew no chemistry or biology and had no certification, and town engineers who knew little or no water, sewer or drainage system design procedures. In many cases, it was evident that doors were closed to new suppliers of goods and services as there were more benefits involved than were being recorded. One has to ask, How can this occur? The main culprits in the Walkerton case should have included not just governments, incompetent operators and testing labs, but the friends (and relatives?) in high places who allowed the operators to be hired in the first place. It’s easy to blame everyone else, including the poor operators, but what type of references did they have, and what was on their profile that made them acceptable employees? Who were the members of the hiring committee who made the recommendations that they were the best candidates? Although this may have entered into legal proceedings, as far as I can tell this type of information has not been disseminated. Perhaps steering the blame elsewhere takes the heat off others who might be implicated.

H. Robert Jones, P.Eng., Dundas, ON



RENEWABLE ENERGY PROJECTS

Re “Affordable renewable energy: How microfinancing powers rural Bangladesh” (*The Journal of Policy Engagement*, December 2010, p. 20)

This is a captivating true story of engineering, economics, finance and people. It shows how the economic multiplier effect of renewable energy can help eliminate direct subsidies and raise standards of living. The microfinance mechanism seems well adapted, and it would be interesting to find out how the lack of loan collateral and associated risks are managed. Banks tend to be very risk adverse with regard to new energy technologies—more so in Trinidad and Tobago—but maybe such schemes are worth considering.

Haydn Furlonge, CEng, head, LNG & investment analysis, The National Gas Company of Trinidad and Tobago Limited

SUSTAINABLE SOLUTIONS

I found the latest issue of *The Journal of Policy Engagement* (December 2010) very interesting and enlightening. In “Carbon capture and storage: Technology, status and costs” by Rene Mangal, P.Eng. (p. 15), it is proposed by the experts, including this author, that we capture the combustion products from industry, especially the CO₂, and sequester this gas underground. “The hope is that the buried CO₂ will never surface again. Potential geologic storage sites include deep saline formations, depleted gas and oil reserves, enhanced oil recovery sites and unminable coal seams. Deep ocean storage would involve direct injection of liquid CO₂ into the seabed...as a kind of CO₂ lake.”

In this way, one of the greenhouse gases would be reduced. The further hope is that this cold, high-pressure liquid CO₂ would not be evaporated by the higher temperatures in the depths of the Earth, that a CO₂-lake in the ocean depths would not disturb the as-yet-unknown life forms, and that any oil or gas site deposit would not fracture the rocks.

In the process, it seems to have gone unnoticed that by sequestering the CO₂, the carbon is returned to fossil status, but oxygen is also removed from the atmosphere and deposited underground. Over decades and centuries, this process would slowly deplete the limited oxygen content of the atmosphere that we rely on to sustain life.

To me, this is a case of humanity either committing collective suicide by global warming, or alternatively committing collective suicide by oxygen depletion in the atmosphere. Can we find a better, more appropriate solution?

W. Ernst Eder, P.Eng., Kingston, ON



ELECTRIC NOT A BARGAIN

Mr. Petrie makes some insightful comments in his letter, which I found quite interesting (*The Journal of Policy Engagement*, December 2010, p. 4). However, one factor that seems to escape attention when discussing the fuelling cost of electric battery vehicles is the road tax that is imposed on gasoline.

Mr. Petrie calculates that an Ontario driver will be able to fuel a car with electricity at a cost of 30 to 40 cents per litre equivalent (vs. gasoline at more than \$1 per litre). In Ontario, there is a tax of 30.1 cents per litre on gasoline (according to www.ontariogasprices.com). Assuming the government is not willing to forgo collecting this tax on electric battery vehicles, the cost of electrical refuelling will rise to 60 to 70 cents per litre (based on Mr. Petrie's numbers). Obviously, electric refuelling will still be cheaper than gasoline, but not quite the bargain it originally appears.

Mike Bell, P.Eng.
North Saanich, BC

IT'S NOT ALL ABOUT FAILURE

The January/February 2011 *Engineering Dimensions* article, "Engineering detectives go to the heart of the matter" (p. 46), provided a timely forensic examination on the practice of forensic engineering. It should be stressed that forensic engineering must not be associated solely with failure events. This is the wrong message to send to our students and future engineers. Contrary to the comment made by Claude Pillete, P.Eng., forensic engineering is far more than just a "sexy term for failure analysis." Forensic engineering deductive principles can provide the fundamental tools for what is called "condition analysis," to prevent failure from happening in the first instance.

I will return to an example quoted in the article. The carbon fibre bicycle forks that failed, causing serious injury to one of Canada's top triathletes, did not contain nano-crystalline metal coating for extra protection as mistakenly pointed out in the article. A preliminary failure analysis of the subject carbon fibre forks revealed that one fork blade likely suffered an impact event from road debris, resulting in a surface stress concentration that provided the initiation site for a catastrophic crack that ultimately severed the fork at some later time. It remains to be determined whether the carbon fibre material was properly designed and manufactured for its intended use.

In parallel with the forensic examination of the subject carbon fibre bicycle forks, I have been working with Integran Technologies Inc. and their affiliated company in California (PowerMetal Technologies) that develop nano-metal technologies to significantly strengthen polymers and composites for the automotive, aerospace, electronics and sports equipment industries. It was clear that whatever caused the subject carbon fibre forks to fail, a solution was necessary to prevent such a condition from occurring in the future. The knowledge obtained from forensic analyses of failure events was immediately translated to innovative design concepts. Integran/PowerMetal Technologies now provide ultra light, impact resistant and high strength nano-metal bicycle components to mitigate the type of failure observed for the carbon fibre fork in question. In addition, the nano-metal technology renders the external surfaces of plastics and composites available to provide clear witness markings of potential impact events. Accordingly, in the event of a failure, a more definitive accident reconstruction can be performed than is possible with bare plastic or composite components, thus providing further assistance to a design engineer or a court of law.

It is clear that forensic engineering is not only about using scientific and engineering principles to reconstruct the history of a failure event, but also about analyzing existing conditions to improve the future. We must not treat forensic engineering as an end in itself but as a vehicle to help make society better, just as engineers have done since the very beginning.

Doug D. Perovic, PhD, P.Eng., Toronto, ON



[LETTERS]

ATTRIBUTES OF A FORENSIC ENGINEER

I was one of those interviewed for Michael Mastromatteo's article and I feel I must respond ("Engineering detectives go to the heart of the matter," *Engineering Dimensions*, January/February 2011, p. 46). He obviously had no idea of the snake pit he was getting into. All things considered, he did a commendable job.

First some corrections: I was never the chair of the Professional Standards Committee.

Secondly, while it is true that I said I was a "hired gun"—the greatest insult inflicted on a forensic engineer—it was intended as an explanation of the work we do, i.e. we have special skills not found in the general population and we are hired, just like a western gun slinger, to apply them on behalf of the community or vested interests. This is why we must avoid advocacy—and this also means "negative advocacy." That can be left to the opposing experts, as that is their function.

But the main point I must make is that there was almost no mention in the article of the most important attribute of a forensic engineer, and that is a working knowledge of corrosion. Canada's annual loss due to corrosion is around \$35 billion. In my experience, corrosion in one of its more arcane forms has been found to be involved in well over 50 per cent of all failures.

Engineers have little knowledge of the basic corrosion mechanisms. To illustrate, up to about the year 2000 very few corrosion engineers paid much attention to microbially induced corrosion (MIC). Now we have literally scores of lawsuits that involve MIC in failed fuel oil tanks and millions of dollars in damages.

This is currently under investigation at U of T and has yet to be explained.

John F. Clayton, P.Eng., FEC
Brampton, ON

Letters to the editor are welcomed, but should be kept to no more than 500 words, and are subject to editing for length, clarity and style.

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.

CLIMATE CHANGE OPINIONS

David Moffat, P.Eng., in his letter ("Discredited comments," *Engineering Dimensions*, January/February 2011, p. 70) uses the pejorative "climate change denier" in his description of Robert S. Norminton, P.Eng. There is no indication in Norminton's letter (*The Journal of Policy Engagement*, October 2010, p. 4) that Norminton denies the phenomenon of climate change. Norminton simply and reasonably calls for us to dampen the climate change hysteria and to take the time to do proper research before rushing headlong into hideously expensive and socially disruptive schemes—schemes intended to ameliorate what may turn out to be a chimera. I suggest to Moffat that denigrating a fellow engineer only serves to undermine his message and lower his esteem in the eyes of his peers. In addition, Moffat calls for the censoring of views that do not meet his approval. I feel obliged to remind Moffat that, at least for the present, we live in a country where freedom of expression is one of our most cherished rights.

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

PEO TRANSPARENCY

Some of the candidates, especially for president and vice president, comment on the high cost of PEO and call for fiscal restraints (2011 council election statements insert,

Engineering Dimensions, January/February 2011). The government of Ontario publishes publicly (they are available on the Internet) names of employees with incomes exceeding \$100,000. Why not do the same by PEO? Also, perhaps PEO should publish the budget and actual expenses in comparison with the "approved" budget. I think such transparency will make all of us feel better. I intentionally did not send this email until after the sending of election ballots and know it will be published only after that. I hope it does not affect the voting for or against any candidate.

Mohammed A.R. Osman, P.Eng., North York, ON

