

Sustainability: Necessity is the Mother of Invention

Green systems, sustainable technologies and environmentally-friendly solutions. These are terms we see and hear on a daily basis. The following conversation with Seth Pearlman, president of DFI, discusses the current state of sustainability in the deep foundations industry and how a willingness to save money will drive continuous improvement for sustainability in our industry.

Is sustainability a buzz word or a reality?

Five years ago, there were numerous, people saying that the CO₂ issue was not real and that global warming was not scientifically correct; that it was a political issue, not a social issue. Even those who doubted the situation in the past, are admitting the reality now. However, it has taken high gas prices, a housing crunch and an economic downturn for many people to admit that we have to be serious about conserving energy and resources. The fact is, most people won't take action unless there is a financial benefit to do so.

Do you think this is true in business – that people won't take action unless it can save money?

A friend of mine, who is a successful businessman, likes to say "when they say it's not about the money, it's always about the money." I was with a client recently and was promoting my company's tagline, "sustainable technology." I was explaining how our process, compared to other applicable processes for the job, would be more sustainable. I pointed out how we could demonstrate, using carbon footprint analysis, just how sustainable our technique is and how using sustainable approaches is the right thing to do, when he spoke up and said, "So your stuff must be less expensive then."

What can we do as an industry to make sustainability a cost-effective practice; one that can be implemented?

Necessity is the mother of invention. We need to invent and introduce materials, techniques and solutions that put less carbon in the atmosphere. If you burn less fuel in the process chain of your project, you will have a lower carbon footprint and your project costs will be cheaper. By looking at both costs and sustainability, we will find inherent compatibility.

What are some examples of reducing carbon footprints?

A few examples that come right to mind include the use of carbon efficient recycled construction materials, such as slag, flyash or recycled concrete. One of the biggest carbon generators is fuel usage, and we need to look at processes that minimize the trucking of materials into and out of the site. Processes that minimize spoil generation are particularly beneficial in this area.

What else can we do to drive sustainability?

In our industry, sustainability really means less conservative designs using fewer materials and resources to produce. This can only be attained with a philosophy of continuous improvement. The problem we face is that, in our industry, we are over designing because we do not always have the documented information we need to turn design efficiencies into cost-effective, sustainable practices.

Why is our industry over-designing solutions?

Within our organization, we have some of the best and brightest in the world of equipment/process design, engineering, and field installation of foundation technologies. We have the ability to design and implement many new ideas. However, we over-design for three reasons.

- 1) We have a market with a major dichotomy. Private clients are cost motivated and will accept new technology, but still want to put the risk in the hands of the supplier. Public sector clients want even less risk and are not always willing to accept new technologies from others at face value.
- 2) There is the fear of failure, and rightly so, since as engineers we have a fundamental obligation to protect loss of life. When ground is not improved, liquefaction can occur. When piles are not put under foundations in a stream, wash-out and scour can undermine the foundations as they did in Schoharie Creek in New York. When deep foundations and ground improvement systems are introduced, a great many redundant load paths are introduced. Yet, can anyone in our organization find a catastrophic failure of deep foundations or a ground improvement installation?
- 3) We design deep foundations systems for higher factors of safety because there are so many unknowns in our work, we have less confidence in material properties, installation irregularities and ground characterization. Steel structures, for example, are designed to a very tight specification of safety, so there is a very high level of reliability with material properties and fabrication tolerances. Combine this relative comfort level with a mistake and a lack of redundancy and disasters occur such as the I-35 bridge in Minneapolis.

What can we do to champion less expensive designs using less material and resources?

Many writers have discussed the great value in the observational approach for excavating support work, but few engineers are willing to extend these concepts to permanent foundation design. We find it hard to get owners to obtain settlement data on projects since there is no perceived benefit to that effort and it costs money. Yet such data can only benefit future projects if design efficiencies are gained from the feedback. We as an industry can work to gather and disseminate data from successful installations when available, to increase confidence levels with newer, more efficient applications such as ground improvement.

Are we heading in the right direction?

Yes. With the collection and dissemination of valuable data on the results of new technologies we can attain a philosophy of continuous improvement that, coupled with a willingness to save money, will drive sustainability in our industry.

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