

“Oh, you’re a structural engineer? That’s so cool!”

...

“So what do you do, exactly?”

I have to imagine that is a commonly heard refrain for any member of the structural engineering community. In general, members of the public have an enthusiastic respect for our profession, with essentially no substantive understanding of its actual activity. It is an advantage that is sorely underutilized; what better position to start from to work towards better public engineering literacy, policy outreach, and STEM education initiatives? We don’t have to convince people that our profession warrants attention and respect before delving into the public matters that sorely need our attention.

Why, then, is our infrastructure crumbling, ignored until catastrophic failures occur? Why are structural policy lobbyists shunned in favor of other, arguably less important, voices? Why are clients routinely surprised by code requirements and low-serviceability or low-resiliency construction? Because while they know that what we do is important, they have no idea what it is or how it is accomplished. In order to achieve the progress and goals that are paramount to the future of our profession, we must enact a broad, multifaceted, and unignorable campaign of public education.

Any such campaign cannot begin at the top, driven by haranguing politicians and lobbying for pennies on infrastructure policies that merit millions. Such initiatives have continually failed, shunted aside by powerful, moneyed interests intent on maintaining dominance even at the cost of the masses. Our campaign, as any structural engineer will understand, must begin from a solid foundation and be built up via many intricate connections. True institutional change can and must be a grassroots movement, wherein the many learn to advocate for themselves and the infrastructure that sustains them.

Firstly, structural engineers must continue efforts to push for integrated STEM education beginning at even earlier ages. Even those students that don’t pursue engineering careers should be instilled with basic engineering knowledge, such as statics and load paths. This knowledge is easily applicable in all types of careers and will help people from a young age to better observe and understand the structures in and around which they live their lives.

Next, individual engineers and local engineering organizations must take it upon themselves to educate the greater populace about structural design as it applies to their lives. Homeowners should understand why certain repairs or upgrades must be made to their homes. Architects and developers should be aware of resiliency issues in designs and coached to make long-term decisions on performance-based measures. While sustainability and resiliency issues are being discussed in engineering circles, it will be a long time before they make measurable impacts on codes and design standards. It will be longer still if there is not increased public pressure to demand high-resiliency design. Such pressure can only be realized by large groups of people learning what we actually design for.

Individual engagement will begin to spark a wider conversation, stimulated when the issues are brought to the forefront of public attention. When disasters occur and structures are damaged beyond repair, people ask why. Why did this building not withstand that hurricane, or why did the

earthquake so badly damage that one? Only then do people learn that life-safety, not resiliency, is the design basis of structures. In the wake of disasters, minor public outcries arise that standards should be increased; that buildings should not be a write-off after a single event. But those outcries are localized, often individual, and always short-lived. The public attention span for single events is brief, and only those most affected have the motivation to push for more.

As infrastructure continues to deteriorate across the country, these incidents will become more frequent, and on a larger scale. Single homes give way to damaged bridges, give way to collapsing apartment buildings. People will learn and begin to pay more attention, but this comes at the cost of millions of dollars and countless thousands of lives lost or irrevocably altered. Public awareness campaigns must supplement spikes in the public's attention by sparking discussions about historic failures as well as current ones- by connecting the dots to preempt future, tragic failures. Engineers and engineering organizations must branch out from their individual, personal efforts to engage local and national media and governments to assist with engaging and educating the public.

Any education initiative must be prepared to preempt the inevitable reticence toward increased infrastructure expenditure. One of the most common arguments against a massive national overhaul is cost; it is also one of the most easily dispelled. Invariably, the cost of post-failure recovery and reconstruction is many times the cost of the neglected preventive measures. Those people and organizations working to broaden public understanding must be armed with the facts and real-life examples to demonstrate the importance of preventive action.

Finally, it is important to focus on the genuine improvements that infrastructure spending brings to peoples' lives; from providing clean, dependable water to striving for efficient, fast public transit. We as educators must be able to present as an attainable, deeply desirable reality these notions that the public has been taught to believe are unrealistic, and undeserved. Present examples from successful projects, nationally and globally, and give concrete demonstrations of what people stand to gain.

Make people aware of basic engineering principles. Show them how fragile and prone to catastrophe their surroundings have become. Teach them that prevention is incontrovertibly preferable to repair. Inspire them with what could be the reality. Make them angry and scared and yearning for better. And turn them loose.

Once the public begins to become aware of the scope of the issues facing us, not just with existing structure, but with the way even new structures are being designed and built, the policy will come. Money follows public attention and laws are driven by money. When the tide of public opinion shifts to demand accountability and improvement, when political donations and offices become jeopardized, the powers that be will spring to action. Codes and laws will be rewritten to mandate resiliency. Funds will be allocated for repair and improvement. Private industries will work to provide products that facilitate the work to be done, will advertise and provide those products to infrastructure projects to garner public approval. As when the WPA built roads and bridges in the years following the depression, people will get a taste of the improvement and demand more. And when they receive it, they will know enough to fully appreciate it. So that when they hear that you're a structural engineer, they won't just know that it's cool.

They'll know why.

