



# INTERNATIONAL WOMEN IN ENGINEERING DAY

June 23rd, 2024

## **When did you first become interested in the built environment?**

When I was about 7 – 8 years old, my family wanted me to exercise reading English, and gave me some English books with fairy tales. They were boring. My dad's issues of Scientific American were a lot more exciting! There I read about black holes, about how to estimate the distance to stars, about the movements of the tectonic plates and yes, also about the greenhouse effect. And with the naivety of the child I was, I set out to solve the problem of that last one. I designed railroads with trains on magnets to reduce friction, and sustainable villages with solar and wave power. That was my first encounter with sustainability of built environment.

Then, since nature was a big love of mine, besides science, music and art, and I was fascinated by ecology in particular and biology in general, I took university-level biology in high school, got an award for outstanding achievement in the area of science and figured I'd become a biologist. Still today, a lot of my way of relating to life goes back to my affinity for biology. Only, right before I was going to apply to university, I suddenly realized that the job market for biologists – especially in research, which I always thought was what I was going to do – wasn't quite what I had in mind. Most jobs were in pharmaceuticals – interesting too, but not really contributing to a sustainable future, the way I wanted to. I remembered my sustainable villages, the ones I designed as a child, and applied to Architecture School instead. Which, at that time, long ago, really wasn't into sustainability. I had to find ways to investigate that theme more or less on my own. But I felt like a fish in water in architecture as a subject – it satisfied my creativity and artistic side, while making a contribution to the environment of people – and if I could make it sustainable as well, life would be perfect!

It was, as long as I was still in school. I did my master project on sustainable building in urban environment, and thrived. However, when I got out on the job market in 1988, there really wasn't much request for sustainable building at all. There were some "eco-village" projects, and they did want my work – as long as it was for free... But to support myself I had to get a job designing modern office buildings. Not exactly what I had had in mind, but ok, it did give valuable training as an architect.

However, something I realized was that old buildings often were made for or suitable for retrofitting with the passive strategies I had learned about in my studies about sustainable building. I started my own business, mainly renovating old, often historic buildings (though, ok, we did some new buildings too, once in a while...). And they were exiting challenges, which not only posed demands on respect for the existing substance, and creativity and ingenuity in finding solutions that would bring new use and life into the buildings without threatening their historic integrity, they also had a lot to teach about how to build sustainably. People of the past weren't necessarily less intelligent or creative because they didn't have access to electricity and all the gadgets which we have today – to some extent they had to be smarter because they didn't.

And yet, creating an indoor climate which would both preserve the old substance and also provide an acceptable environment for modern life was a challenge, and one which caused me some worries. I often had to use added interior insulation since the exteriors could not be touched, and although I made it thin and followed all the rules of thumb, using the Glaser method, there was still always that uncomfortable feeling that with time, there could be moisture issues and hence damages and/or mold growth despite all my efforts. So with the best intentions and efforts to bring these buildings to life and use, I could be contributing to future damages. I wished there was a tool to predict the future consequences of the different options...

And there was! Building simulation! So when I got a chance to do a PhD in building science, on the subject of building simulation of historic buildings for preservation and energy efficiency, I realized I could do more for sustainability at the university, abandoned my architecture practice and went for it! And got re-trained, from architecture into engineering. Now I am a researcher and love getting paid for being curious, and finding out how to create ways to make buildings sustainable, and I have been teaching sustainable building – and building simulation, building physics and building in general – at KTH for 15 years.

So now I'm a hybrid, and that actually has a lot of advantages! Having double backgrounds makes cross-disciplinary communication easier. The training as an architect gives access to a problem solving methodology which alternates between a meta-level, holistic view and zooming in on details, resulting in a slightly fuzzy, lateral and creative approach which is useful in combination with the more linear, focused problem-solving in engineering. The many years I've spent on having my own business – over 20 years – gives me an understanding of the world of consultants and working with real, existing cases, which I think is healthy for a researcher – it provides a good reality check, and makes me keep a focus on the usability of what I do.

Having worked for years documenting and getting into the systems of old buildings also keeps my research related to reality as well as history – and the work together with conservators during my years of practice has both taught me respect and appreciation for their knowledge and skills, and for the importance of the cultural heritage and what it teaches us. I also get a sound reality check of my own (original) profession by being re-trained into another one – its useful sides as well as shortcomings, such as an often occurring prevalence of a shallowness when it comes to perceiving the buildings as systems, a lack of understanding for the underlying structures of the buildings and a certain science-resistance within the general practicing of architecture...

To me buildings have always been a kind of organisms, with a skeleton in the form of their load-bearing structure, a skin which is the building envelope, their systems, such as air exchange, heat and moisture transfer and controls in the form of building services – and functionalities as well as a soul. None of those parts is less important to me, since they are part of the same entity. Thus, I can get a bit frustrated with colleagues who focus only on the surfaces, and just maybe also on lighting – it is not what I consider architecture to be about. But being on the engineering side as well gives me the possibility to say so! So being a hybrid is something I really value.