ASHRAE Leadership Recall (formerly Leadership Recalled)
Transcription

Interview of: Jeffrey Spitler

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Interviewed by: Rod Kirkwood

Note: Interviewer hard to understand in some questions denoted by a ? in the question.

The next interview is with Jeffrey V. Spitler of the Oklahoma State University and one of the leaders in the HVAC&R industry. Please tell us how it was that you became interested in ASHRAE.

Jeffrey Spitler

Well I was an undergraduate mechanical engineering at the University of Illinois at Urbana Champagne and I started to take classes in heat transferred and thermal systems, particularly the thermal systems. A class taught by Curt Peterson and the book by Wil Stoecker Famous HVAC&R professors there and when I finally got to that I thought, wow this is really interesting. It was the most interesting thing that I had done. I really enjoy the computer simulation of the systems. I was also interested in energy efficient buildings and I found out about ASHRAE when I joined as a student member. That was in 1982. And I was so interested I was talking to Curt Peterson about maybe, I was thinking about getting a master's degree and he said, oh well that's good and how about, I got a project that you might be interested in working on and so he told me a little bit about it. It was involved with really, sort of two parts. There was a project that was related to measuring convective heat transfer inside buildings and he was also going to be starting up what was called the BLAST support office. BLAST was, still is a program for simulating buildings, energy consumption. BLAST is Building Loads Analysis and Systems Thermodynamics. It was going to be starting a, what he called a BLAST support office. It was funded by the corps of engineers and we provided support for this computer program to help people simulate buildings. We worked with a lot of engineers in the US army corps of engineers. And so I sort of had this, got on this twofold track of doing experimental convection heat transfer work. That was started when I was a senior. I started rebuilding different parts of the apparatus and fixing the air conditioning system and redoing the duct work and all the sort of hands on things. So started with that and started doing both computer simulation experiments and I really enjoyed it. When I started it I had no thought whatsoever of getting a PhD but after I saw what Curt actually did for a living and he was very active in ASHRAE and I thought well this is really pretty interesting. In addition to teaching classes you do all these research projects and you go make presentations at ASHRAE meetings and he did some overseas travel and so on. So I thought it was all very interesting and I was getting finished with my master's degree, he basically gave me an offer to be a research engineer and I could work on PhD part time. And that was really, really appealing to me and I started going to ASHRAE meetings. First one was a, Kansas City I think it was 1984, summer of 1984. Since then I've been to nearly every ASHRAE meeting except for a couple that I had to miss because of the impending birth of a child. My wife wouldn't forgive me

for missing that. Ever since I went to my first national ASHRAE meeting, I've was always found it very interesting. There's so much stuff going on here and just from there I worked on PhD and did research at U of I until 1989. I finished my PhD. I was looking for a job and I interviewed at Oklahoma State and new that Faye McQuiston and Gerald Parker had been there. I knew their book. I knew some of, a little bit of their research. I knew that Oklahoma State had a history of sort of doing HVAC&R research and I decided to take the job there. I thought going someplace that already had and established reputation in the industry and so on was probably a good idea. When I went there I got involved, well I started out at the chapter level and I was also doing technical committee work at the national level. So my participation just seemed to have kept creeping upward. I was the student activities chair for the chapter for several years and I was regional vice chair for student activities and on the national student activities committee. Sort of an active member of a TC, a very active TC, TC 4.7 energy calculations. And I chaired some sub committees and then eventually became secretary and vice chair and chair. So let's see. Since then I've been serving on the Research and Administration committee, and just coming on to scholarship trustees and serving on the editorial board on the International Journal of HVAC&R. And all of those things together are really keeping me very busy as ASHRAE meetings.

Well you're still on the faculty.

J.S.

I'm still on the faculty.

And what are you doing there?

J.S.

Well my problem, my biggest activity has been in research. And I've done a fair amount of research in load calculations. Started when I came, Faye McQuiston was still on the faculty. He had a contract to write the second edition of the cooling and heating load calculation manual. First one that had been written by Bill Rudoy. And the TC 4.1 load calculations had put out this work statement and contract to write a new manual. So I came onboard on that effort, started developing material for this manual and also some new methodology for the CLDT procedure and so on and I started with that. And since then, I did quite a bit of research and I'm still doing research in ground source heat pump systems. Developed a lot of simulation methodologies for ground source heat pump systems so we can simulate in a building energy calculation program like BLAST or Energy Plus, Transis or HVAC Sim Plus. We've used a number of different programs but we've been interested in designing or being able to design the systems using simulation. It's somewhat different than a regular building like designing a VAV system or something because it depends, the system design depends not just on a peak day or a few peak days. It depends on the long term, what happens over the year. How much heat is rejected to the ground versus how much heat is extracted. So we sometimes do 20 year simulations just to predict what's going to happen with the ground heat transfer. So, done a fair amount of work for the Department of Energy. On that and some other sponsors. National Electric Cooperative Association. With manufacturer Climate Master. So on to develop new software, new methods for analyzing the systems and letting people really sort of predict what's going to happen with system and if it's a good idea from an economic standpoint. Also there's a, the ground source heat pump market has gone more and more commercial buildings. I think in the 70s and 80s it was primarily residential and then there's in the 90s and more

recently, there's just been an upswing in commercial applications. And so there's more interest in what are called hybrid ground source heat pump systems because the typical ground source heat pump system rejects, in a commercial building in the US typically rejects more heat then it extracts and you have this excess heat that you either need to get rid of or make the ground repeat exchanger bigger and it's generally cheaper and more cost effective to get rid of the heat some other way. So the simulation tools that we've been developing allow us to sort of predict what's going to happen if you put on a cooling tower or if you use the heat or something else like heating hot water for dishwashing or something in a restaurant. So you can look at all the interactions of what happens over time. So that's, the load calculation and the ground source heat pump systems and some work on energy calculations are probably my biggest areas of research. And of course we teach classes. I guess you can say we have four or five classes that are related to building indoor environmental systems and thermal systems. There we have a very active undergraduate program but also an active graduate program with a number of master's students and PhD students. So all of those things keep me pretty busy and along with the ASHRAE work and some other society work.

Where you involved in the snow melting project?

J.S.

Yeah, that was an offshoot of the ground source heat pump work. So it's kind of interesting project in that the idea, from my perspective, came from a former governor of Oklahoma, former senator Henry Bellman. He had the interesting perspective of having early on his career served on the board for the Oklahoma Turnpike Authority. And he's told a pretty good story about how, you know, he'd be in these turnpike authority meetings and they would say, we have to replace this bridge. It's only 12 years old you know, why is that? Well because they salt bridges much more often than the rest of the roadway and they rely on this re-enforcing steel. It tends to leach down and corrode the re-enforcing steel. So he knew about this problem and then he had some interesting in ground source heat pump systems and worked some with Jim Bose, another ASHRAE member at Oklahoma State on ground source heat pump systems. So he actually asked is it actually possible to use a ground source heat pump system to heat the bridge deck so that you can avoid the need to salt the bridge deck. So we worked for almost six, seven years on this technology, developed a working system. You know it's quite capable of working on along with the ground source heat pump aspect we also worked on forecasting controls so you could predict when the bridge deck's going to need heat. It's actually something that's not just of interest for bridge deck applications but any sort of snow melting application. If you could forecast when it's going to need heat you could do a much better job of melting that. So he developed methods for predicting snow fall but not really, I guess you could say fundamental methods using the National Weather Service forecast and automatically pulling these automated digital forecasts down and then making a decision of whether to turn the system on or not. So but like many things we work on as research projects,the technology is basically that it works but it's very expensive so it's a little hard to justify. We're looking at ways we can cut the cost. Unless we can find some really good ways I don't anticipate too wide of an application.

R.K.

You sound like it has some significant justification and what is serious in the cost of maintaining a bridge. Not just the servicing of the bridge to clean the snow off of it but the damage to the bridge because of the salt.

J.S.

Yeah. Right. And there's also just the safety factor. So there's a lot of things, your typical HVAC engineer, myself included, does not typically think about in terms of cost of an accident, you know, in terms of traffic backlog, human life and so one.

R. K.

That's something either the highway system or someone else could assist in. Put together a picture of how well this is doing. And it may come closer to justify itself then it would simply by the means of keeping them from having to remove snow.

J.S.

Yeah, yeah I think that's the ultimate answer.

And this may be the way to start to be able to broaden it out from there. The bridge gets to be a little extra complicated because you got a load of piping but on the other hand you're not going to have to use the snow blowers unless something fails. And so it's a, perhaps it doesn't add much to the weight of the bridge and so on but it does add something to the strength of the structure and things of that kind. All of that would have to be taken into account. It seems to me like it would be one of the things you might think seriously about, organize it. And looking at it for a basis for further review to how the cost can be, down to the point where it's more economically.

J.S.

And that's something we are continuing to work on. But we haven't, I won't say we've reached a breakthrough yet. But it'll probably be done incrementally .

Well, two things that you can't find a way to improve as you go along and usually the improvements can be a savings in cost. On the other hand improvements can sometimes add to the cost but again they have to be justified. But in any event, it's a long term life that every bridge, every major bridge in the United States has ? simplify ?. and you can go ahead also, I guess we can add to that other serious slopes on country roads or at least on the freeways where they likely to have snow and ice conditions. So it might be something that could happen eventually up to a certain extent. There's a need for it.

J.S.

Definitely.

If it's economically justifiable, it'll happen. So it's really very worthwhile. It's a good thing you've done. It's worth seeing what we can do from here to expand the concept. But that's what ASHRAE has done all along.

J.S.

Yeah. That's right and some of the research, well we're getting ready to publish some of the research. A number of interesting related to snow melting design in general, regardless of say bridge decks. There's, ASHRAE's had a moderately active part of the Society that, small, but active part that works on snow

melting and different applications. And we're looking at how the design is done and have some new proposals for that.

How do you see ASHRAE improving and where do you think ASHRAE is going?

J.S.

Well I think there's several areas that I see and I'm sure I just have a very small picture of the whole thing but things that I see are, you know, I spent a lot of time on building simulation and different types of load calculations and so on and I think, you know, most of our research is aimed at the methodology of, you know, how to do it accurately and so on. And I think that's very important sort of bedrock or foundational work but I think the biggest innovations probably are going to come more from user interfaces that let engineers really do their load calculations very quickly but also very quickly do energy analysis. Right and this is coming from areas outside of ASHRAE of course but the ability to not only quickly do your load calculation but also quickly check for different system types and see which one, you know, which type of options give the best energy performance and the best thermal comfort and so on. And I think that ASHRAE has spent, or parts of ASHRAE, energy calculations committee, load calculations, spent a lot of time coming up with these methodology. It's really coming from market forces that people are developing better and better user interfaces and make it quicker and quicker for engineers to find the answer. You know what if I tried this system what if I use this system, is the ground system pump a good application. So I think that's, it's going to I guess you could say speed up consulting engineers ability to check these sorts of things. You know consulting engineering is like, well like the rest of us they have to do what's economically feasible, you know, and they can't afford to check every possible combination. They have to go a lot, you know, their experience and so on and that's what they should be doing but I think that as the user interfaces for these programs continue to improve I think the sort of incremental cost for an engineer to check some of these things will fall. I think it will lead to more energy efficient buildings. Another area, I guess you could say my own area, a little more closely as I, you know for a long time ever since I took thermodynamics been interested in sort of the optimal way from the thermodynamic standpoint to so things. And I think the ground source heat pump systems as they stand today, they go in that direction but I think the possibility to make use of other heat sources and heat sinks and integrate everything together it's certainly not something that's going to apply to every building. But there are some very interesting opportunities. Things like gas stations that use ground loop heat exchanger and ground source heat pump system but also has the refrigeration connected to it, the car wash heating and use the, I guess you could say, the diversity of sources and sinks to minimize the costs and also provide a lot of value. But I think there's room an direction to provide some more innovating engineering in using those sorts of technologies. And I think a third area is probably what we generically call green buildings but just the ability to design buildings that use very low energy. I think for the time being it'll, you know, right now a very sort of encouraging thing is that market forces are driving this, not people deciding to do it because they're going to save money necessarily but deciding it would be a good public relations to have a say, lead certified building and it's driving a lot of innovation, you know. Maybe not from the pure economics but I think that will probably follow later in some cases.

R.K.

Any other suggestions for bringing more number, more people into our own history whether they come in the path you did or any other alternative path. ? Industry that has a need for people.

J.S.

Yeah I guess my, you know, my experiences as a student is probably not the typical path. I think it's a good path. You can get students interested but I don't think, I'm probably not the typical student that goes to work as a consulting engineer. I think as an industry, I'm not really sure what the answer is but what I observe is that consulting engineers, there's a lot of consulting engineers typically interested in hiring people with experience. A lot of students when they get out don't really, you know, I often meet students who are interested in ASHRAE technologies but you know they get out they have three offers and none of them are in the HVAC&R area so I think to the extent that as an industry we can do, say Internships. Those sort of interactions where you can meet students before they graduate, I think it's probably the best way for industry to find students and to also bring them into ASHRAE. So that'll be in terms of my own insights that would be what I would see as sort of the biggest way to sort of encourage students to follow through and join ASHRAE. Certainly been a tremendous society for my own career in terms of meeting people and having all kinds of interesting opportunities. Things that really appealed to me when I saw what Curt Peterson was doing. I've had those opportunities many times over with ASHRAE.

R.K. I think it’s a good industry. I've been in it for a lot of years so it's most past history for me. But at any event, I see it having a good future.

J.S.

Oh I think so.

R.K.

Green buildings will work if the people are comfortable with them.

J.S.

Oh right, absolutely.

R.K.

But if we're not, they're not going to go for building uncomfortable conditions no matter how green it was.

J.S.

That's right. That's something I agree whole heartedly.

R.K.

That's something we have to understand. Jeff, it’s been a great job. Well I guess that really finishes up.

J.S.

Okay.

R.K.

Well done.

J.S.

Thanks for your time.