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On Comfort, Physiology and Psychology

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"Bill, you've got to come out here," I heard Jan say from her receptionist's desk out front as soon as I hung up my phone and the light went off for my line. Jan was this tiny little blonde who couldn't have weighed 100 pounds. Her face was red and she had tears running down her cheeks. She was grinning from ear to ear but trying to maintain some control just to keep from falling out of her chair. In addition to being a dynamite receptionist and secretary, she had assumed the responsibility, from the minute she had first walked in the front door, for keeping everyone's spirits high, all of the time. What a great outlook on life she had and it just radiated from her; from her smile to her big eyes with the mischievous quality that made you think she had put a whoopee cushion on someone's chair and was just waiting for whoever it was to sit down. She was so good with our clients, contractors and suppliers. One phone conversation with Jan and whoever was on the other end felt like they had a new best friend. She had a Carol Burnett quality; you could hear it in her voice. She seemed always on the verge of bursting into laughter and you always wondered what the joke was.

Well, if anyone could defuse a situation or solve somebody's problem, it was Jan. Apparently, while I had been on the phone, one my biggest critics had stopped in to lodge a complaint about the temperature in her 4th grade classroom. She was always hot and no one cared, not the maintenance people, not the principal, not even the superintendent. The thermostat in her classroom was set at 72 and the building maintenance man carried a thermometer with him that showed it was, in fact, 72 around her classroom. But she said she didn't care what anybody or any thermometer said, it was burning up in there and she wanted me to do something about it. I asked Jan what she had said and she told me that she had recommended the Physician's Weight Loss Clinic, as she exploded into tears. I'll never forget that conversation. I often said that Jan could find a way to make fun of everyone regardless of their race, creed, religion, intelligence or weight. She was a real artist.

Shaking in Bed at 72 Degrees

It was in the middle of a cold Indiana winter night and I was awakened by the bed shaking. I was sleeping in my shorts under only a sheet and my wife, next to me, was dressed in her usual winter pajamas, a quilt, robe and socks. She had at least one blanket plus a bedspread on top of her and she was having chills in her sleep. I put my hand on her forehead and she was cool, no fever. Being the energy geek that I was, I of course had a thermometer in every room. It was an old two story house with a full, finished basement. I had designed a new electric heat pump heating system and wanted to be sure that it was perfectly balanced, that the temperatures in all of the rooms were the same during both heating and air conditioning; and that was tough in an older house like mine. I had decided to install a heat pump after heating oil prices had jumped from 20 cents a gallon to more than a dollar in just a little over a year in 1973 and natural gas wasn't available. (I had heard a VP of Indiana Natural Gas give a talk saying that the world was close to depleting all known sources of natural gas and that it would probably never be available again.)

Individual comfort is obviously very complex and not easily reduced to a chart in a book. Those charts represent averages. They don't represent a specific individual. Maybe everyone should just wear an astronaut's suit with an individual thermostat they could turn up and down as they desired.

The thermometer in our room at that moment read 72 degrees; warmer than it should have been for sleeping according to the comfort charts in the text I was using to teach a Heating and Air Conditioning course for Purdue. Obviously she hadn't seen those charts; otherwise she wouldn't have been cold. We tried both electric blankets and electric mattress pads with dual controls to allow us both to be

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Author Bio

**Bill Holmes, P.E.**

Bill Holmes, P.E. founded Holmes Energy LLC www.holmesenergy.com and developed the AutoPilot Monitoring-Based Commissioning (MBCx) System in 1979. He has a B.S. and M.S. in mechanical engineering and has done additional coursework and research for his PhD. He is a former Purdue professor and taught for several years in the Continuing Education in Energy Management Program at the University of Wisconsin.

Bill has produced savings from 20% to, in a few projects, more than 50% from low-cost, no-cost changes in management, operation, maintenance and control alone in all types of facilities including Industrial Plants owned by Fortune 500 Companies.

He is the recipient of a DOE Award for Energy Innovation and was the Indiana Energy

comfortable at the same time but nothing worked. Sometimes, she would be so cold, she said she felt like her bones were cold. They only way she could get warm was to soak in a bath so hot that when she got out, her skin was so red that, I swear she looked like she was covered with first degree burns. I wondered what the books would recommend for a temperature that would keep us both comfortable in that bed in that room.

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The good news was that I was able to come up with the still little-known 7th Law of Thermodynamics: A couple married longer than 10 years can only be comfortable at temperatures a minimum of 10 degrees apart.

Cars have dual or individual controls so each person can control their personal temperature and comfort. But if two people in the same room can't be comfortable at the same temperature at the same time, imagine just how tough it is to keep a group of people comfortable in the same room at the same temperature at the same time. Actually, it's not possible, so a designer just has to shoot for the average.

The Nurse and the New Heat Pumps

I had made a presentation at a board meeting for a mental health hospital the previous night, and the local paper carried an article about it the next morning. Because the supplies and costs of various energy sources had been jumping around for several years and no one really knew what was going to happen in the future, I had looked at some options for the board. I had been running the facility for several years, had everything in good shape, the annual utility costs had been cut by 59% and comfort was about as good as it could be considering the design of the building.

The building was beautiful. It was built structurally like a bridge and it spanned a creek below it. It had won several awards for design. But the architect had failed miserably when it came to designing for comfort and function. There was no insulation in the walls and more than 7,000 square feet of single-pane windows. I couldn't understand how a building could win awards when it had failed so miserably in terms of the occupants' comfort. I thought the reason it had been designed and built in the first place was to provide a needed space for people.

I had been asked by the board to look at some options to improve the HVAC systems. With all that water below it, I had looked into adding a geothermal system. Install two pipes for the creek to the mechanical room; one to pull water from the river and the other to return it. In the winter, heat would be removed from the water to heat the building and the river water would be returned at a slightly lower temperature. In the summer the process would be reversed to cool the building. Anyway, I had just started to look at that and other options. I didn't even know if it was feasible or would be cost-effective at that point.

Within a day or two after the article came out, I was on the in-patient unit when the head nurse, Eileen, came up to me and said, "I can tell the difference. It's more comfortable." I told her I was happy that she was comfortable but wasn't really sure what she was referring to. She said "it's that new heat pump system. I can already tell the difference. It's much more comfortable. Thank you."

I responded, "Well, Eileen, you're very welcome. You know that I do the best I can to keep all of you comfortable here."

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Manager of the Year in 1990. He has published numerous papers and been making presentations on his projects and methods for more than 25 years. Bill is a sculptor, a writer and a regular contributor to Sustainable Plant.

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