

A Conversation

with Vyt Puzinauskas

Vyt Puzinauskas was AI's Director of Research from the mid-1970s to 1989. He is currently an active consultant for the asphalt industry and is a member of the SHRP Continuing Committee.

Asphalt:

Vyt, tell us about your personal background.

Vyt Puzinauskas:

I went to elementary and secondary school in Lithuania for eight years. It was very demanding, and the exams, which took about four days each year, were tough and exacting. We took both oral and written exams. If you passed the exams and your grades were sufficiently high, then you could get into the University. I had high grades, so I went to the University of Vito Tas the Great. There I began my study of chemical engineering.

Asphalt:

How did you get from Lithuania to Massachusetts Institute of Technology (MIT)?

Puzinauskas:

That's a long story. My thesis at Vito Tas University was on Dry Peat Distillation. Lithuania has a number of peat bogs and I sampled many of them. Some of them contained a coal tar-like substance. I separated the peat and the tar by distillation. I also separated them into alkaline and acidic substances and other chemical solutions. Then I presented my thesis to the experts and defended it. That was the work I did for my diploma.

How I got to Germany is another story. When the Soviet Bolsheviks started moving into Lithuania, we began forming guerilla bands—groups of three, four and five. We had grenades and pistols and were planning to go into the woods and resist. Eventually, we got into East Russia. For a while I was in a forced slavery camp. From there we escaped and went over the Alps on foot. We went into Bavaria

SPRING 2003

and met the U.S. Army. It was General Patton's group.

I remember some things now. We suffered through bombings, and some of them were terrible. I remember we were hiding in an air-raid shelter. It was just a basement. Bombs were falling nearby, on one side of the basement. One big piece of bomb went through the big oak door and hit the wall. It landed very close to where I was sitting. I picked up a piece and it burned my fingers. It was hot like a fire poker. I think God was watching over us or I wouldn't be here. After the war we lived in refugee camps. Then I started working and studying at the Damersted School of Technology in Germany.

Asphalt:

How did your studies in Germany lead you to the U.S.?

Puzinauskas:

Damersted School had an ongoing relationship with MIT in Boston. My professor was associated with Professor Hauser at MIT. Hauser was looking for an assistant with a background in surface chemistry and colloidal chemistry. Well, I had that background and the professor at Damersted said to me, "Why don't you go to the United States and M.I.T.?" So I did.

Asphalt:

What happened while you were at MIT?

Puzinauskas:

I was at MIT for six or seven years and worked with Professor Hauser. There was a soil stabilization laboratory formed by the U.S. Army Corps of Engineers. I started working with them and they made me a supervisor

in the laboratory. It was a big project—how to stabilize soils. Actually, we had to find a way to stabilize mud. We developed some methods, but they were never put to use. Some of the things we did included mixing powders and polymers with the mud until it became solid. Many of the things I was doing there served as a background for my work in asphalt. While I was working on this project, we began to experiment with asphalt emulsions. I worked with one of the first companies that started making emulsions. I was at MIT from 1950 to 1957.

Asphalt:

How did you start working for the Asphalt Institute?

Puzinauskas:

Eventually, the Corps of Engineers began cutting the budget on their soils project. The M.I.T. lab wasn't finished with it, but the Corps was cutting back substantially, so we came to the Asphalt Institute to solicit money to finish the project. We met with Jess Buchanan, President of the Asphalt Institute, and Arv Welbourne in College Park. While we were there, Jess Buchanan pulled me aside and said, "How about you working for us?" I asked Welbourne, "How much do you pay?" He said, "The sky is the limit." Later, I found out that the sky was not that high.

Asphalt:

What was your role at the Asphalt Institute?

Puzinauskas:

I came on as an Associate Research Engineer. At that time, I was the only chemical engineer at the Asphalt Institute. Most of the people there

A Convers

were civil engineers. They came to me with questions about chemistry. One guy I particularly admired was Jess Buchanan. When I came to the Institute, he gave me complete freedom. He said, "You have full freedom to do what you want to do in research."

One day there was a user-producers meeting. John Griffith, the lab director, came to me and said, "The state highway departments and the highway people need new specifications. They need new tests. They are dissatisfied with the whole testing system. They asked us to produce new tests and we accepted." Then Griffith said to me, "Vyt, that is your job. As far as the new tests and new specifications are concerned, that is your job."

Asphalt:

How did you approach developing what was, in effect, a completely new asphalt specification?

Puzinauskas:

My feeling was that we had to become fundamental. Maybe it was my German background and years of research at MIT. We switched from empirical to fundamental measures. That was probably one of the most important steps that the industry took at the time—maybe since the industry began. Looking back on my career, that was my most outstanding accomplishment.

Asphalt:

When you say 'fundamental', do you mean pure research?

Puzinauskas:

My approach was more than pure research. It was to define specific fundamental properties. I think it is the philosophy underlying the research. I think you have to look for the good applications of the material. A lot of times, most of the time, that means an

application from a composite material. Not from asphalt alone, but from a composite material. Paving asphalt is the most commonly used composite material in the world. We use all sorts of stones. And asphalts do vary. They are different. No matter what you write in the specifications, they still vary.

Asphalt:

Vyt, you started doing research on the effects of asphalt and coal tar long before it became an environmental issue. How did that happen?

Puzinauskas:

In the 1950s, environment was not a concern. There was no Environmental Protection Agency (EPA) or Occupational Safety and Health Administration (OSHA). All that came later. In the 1960s and 1970s.

Asphalt:

But you talked about and published research papers in 1975 about emissions and exposure to workers. What pricked your interest?

Puzinauskas:

I think it started with an erroneous opinion. In the early 1970s, the EPA came out in the Federal Register with a regulation, or an opinion, about 'coal tar pitch.' To them, coal tar and asphalt were one and the same. They wrote that coal tar, petroleum, bitumen and a number of asphalt products were derived from coal.

Asphalt:

And they just lumped them together, without any further research?

Puzinauskas:

We started talking to the EPA, telling them, "Look, these are not the same things. They are chemically different materials." The EPA listened. Then I think we owe a great debt to

Luke Corbett. I did the lab analysis and Luke did the chemical analysis testing with Esso Laboratories in New Jersey. They had an extensive laboratory.

Asphalt:

What was the outcome of the research?

Puzinauskas:

We wrote papers—one was RR 78-1—showing the differences between coal tar pitch and asphalt, and between coal tar pitch and road tar and asphalts. We showed that carcinogens did not come from petroleum asphalts.

Asphalt:

You were part of the Strategic Highway Research Program (SHRP) Committee that developed Superpave. What do you think about Superpave?

Puzinauskas:

I think it is a good thing. I still say the approach should involve studying the interface more between asphalt and aggregate. One area of needed improvement is to try to better characterize binder properties. Also, to relate performance to the behavior of finished pavement in the field. I'm still on the SHRP Continuing Committee and we are still wrestling with VMAs and volumetric designs.

I think we should join in the goal of designing a test to imitate nature. Or more to the point, to imitate the pavement in the field, the actual roadway. Often, you cannot imitate that in the laboratory because the real roadway is constantly exposed to heating and cooling, wetting and drying. That means a differential attack on the pavement, one that is difficult to imitate in the lab.

The good thing about SHRP is that there was a cap on the program. We

ation

with Vyt Puzinauskas

did the research and then said, “Now here is the result.” The thing that people are sick of in research is that it never comes to an end. The result of the research is always more research. SHRP did have an end to it, and that end was Superpave.

Asphalt:

Vyt, you've been involved with many milestone accomplishments—developing a new asphalt classification system, studying the basic chemical properties of asphalt for SHRP, guiding Superpave research, and directing countless field research projects. How did you approach these efforts?

Puzinauskas:

My background trained me to study every project as a servant to the public. In other words, it is like a calling. I am not going to approach a project just to make money. A true scientist feels he owes a debt to society. I was brought up and carefully trained to be a good chemist and I owe that debt to society—to be a faithful and good chemist, regardless of the material I represent or the people I work for.▲