Oral History Interview of
James McDonald

Interviewed by: Andy Wilkinson
October 17, 2013
Lubbock, Texas

Part of the:
Wind Interviews

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Preferred Citation for this Document:

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Recording Notes:

Original Format: Born Digital Audio
Digitization Details: interview recorded in three parts; compiled for transcript
Audio Metadata: 44.1kHz/ 16bit WAV file
Further Access Restrictions: N/A

Transcription Notes:

Interviewer: Andy Wilkinson
Audio Editor: N/A
Transcription: Cecilia Morales
Editor(s): Katelin Dixon

Interview Series Background:

In addition to interviews pertaining to the National Wind Institute, oral histories have been conducted with various individuals whose lives have been impacted by wind engineering in the Southwest. For example, interviewers have spoken with farmers and ranchers who witnessed the rise of wind turbines on their properties and adjacent lands, employees of electrical co-ops, and engineers who helped logistically create the large wind farms.

Transcript Overview:

This interview features Texas Tech engineering professor, James McDonald. McDonald discusses his career at Texas Tech in the Department of Engineering and his research on structural damage from natural disasters. Furthermore, McDonald worked as a consultant for storm damage and was instrumental in reworking the Fujita scale. McDonald, along with Kishor Mehta, established the McDonald-Mehta Lecture Series.

Length of Interview: 01:25:21

Keywords
civil engineering, environmental engineering, Lubbock, Texas, National Wind Institute, natural disasters, Texas Tech University

Andy Wilkinson (AW):
And I'll start by saying this is the seventeenth of October, 2013. Andy Wilkinson here with Dr. James McDonald. We're going to be talking about wind and a lot of things connected with it. Could I start by getting your date of birth?

James McDonald (JM):
It's October 15, 1934.

AW:
So you just had a birthday. Congratulations. And where were you born?

JM:
I was born in Megargel, Texas. You know where that is?

AW:
Yeah.

JM:
If you've ever driven from here to Dallas, you pass through it very quickly.

AW:
Yeah. What did your folks do?

JM:
My father was a chef, but in those days, we called him a cook, in one of the local restaurants in Megargel. We lived in a little house on my grandfather's farm. My mother and my grandmother took care of all of us. My grandfather farmed.

AW:
What—is that cotton country?

JM:
Yeah, he raised some cotton and—I think that's mostly what he raised. It wasn't a very big farm. There was a lot of oil on the place, so he didn't have to work too hard.

AW:
Oh, that was—

JM:
He got at least a comfortable living.

AW:
And particularly in that time, the Depression and the drought of the Dust Bowl and—

JM:
Yeah, that oil was developed I think before I was born because all the wells were there and even as I was growing up, they were obviously old and had been there a long time.

AW:
Did you grow up there in Megargel?

JM:
Only through the first grade, and then that was wartime after that. So we eventually moved to Dallas. My father worked in the Murray Gin Company in a—

AW:
Building gin equipment?

JM:
No, it wasn't. It was wartime equipment. They built artillery shields.

AW:
Really?

JM:
They converted the gin manufacturing to wartime effort.

AW:
Did you—so you would have been fairly small, you would have been going to school then, wouldn't you?

JM:
Let's see. I was in the third grade when we moved to Dallas. We were only there a year, and my mother and father got a divorce, then we moved back to Wichita Falls. I spent the rest of my time in Wichita Falls through the eighth grade. She was a single mom, worked for Sears and Roebuck Company, or Sears today.

AW:
That's interesting. When my parents got a divorce, my mother went to work for Sears and Roebuck.

JM:
Really?

AW:
It was a few years later, but that's an interesting story. So through the eighth grade?

JM:
Through the eighth grade. Then, starting in the ninth grade, they enrolled me at a high school in Austin called Concordia College, but it was a Lutheran church school, and I went four years, graduated there. After graduation, I came out to Tech as a freshman. That would've been in 1953.

AW:
Why Texas Tech?

JM:
Well, I had spent four years in Austin, and the University of Texas just overwhelmed me. If you remember, Tech wasn't all that big back in 1953, and a cousin of mine was out here, and I was interested in engineering. And so I came out here and majored in petroleum engineering at the encouragement of an uncle of mine who was in the oil business. Went through four years of it but by then I decided I didn't really like the oil business all that much and I became interested in structural—civil and structural engineering.

AW:
How did you develop an interest in engineering to start with when you were in high school?

JM:
This was—the school—part of the objective of the high school was to train people for the ministry and the teaching field. I found that I had a knack for math and science. We didn't get a whole lot of math or a whole lot of science, but what we had I really liked it and really enjoyed it. And there was a teacher there that I liked very much, he encouraged me, so that's when I decided that I wanted to do engineering.

AW:
Well, when you decided against petroleum—so did you have leveling work that you had to do? Did you have to back up and do something, or do you just keep going forward?

JM:
Well, let me back up just a second. I graduated in 1958, and I like to say petroleum engineers and petroleum geologists—let's see, oil was three dollars a barrel and petroleum engineers were a

dime a dozen. There just weren't any good jobs, but I had really lost the interest. I looked around a little bit. I think the best offer I had was a service company out here at Levelland, and that just didn't appeal to me. I went in to civil engineering, and fortunately there was quite a bit of overlap between the two. There wasn't as much specialization in the different engineering fields at that time. I had courses in mechanical engineering, civil engineering, chemical engineering, geology, so it was a very broad education. So it wasn't hard.

AW:
That's different than it is today, is it not?

JM:
It's a little more difficult to change. Although, I had a student who got his degree in atmospheric science, and he started going out with us on these damage investigations, got interested in it, and saw the advantage of having an engineering background. And he came over to civil—did about a year of leveling, and we were able to get him a degree in civil engineering, and he finally went on and got a master's, went over in atmospheric science then and got a PhD. So he's a very well-trained wind engineer.

AW:
Well—so you're now in civil and mechanical, did you—where did you do your graduate work?

JM:
I did my graduate work at Purdue University.

AW:
Purdue? Both a master's and—

JM:
Master's and a PhD in structural engineering. And there, I was pretty much focused into structural engineering. I didn't get into the environmental—I did minor in soil mechanics because that's an integral part of structural engineering, mathematics.

AW:
What did you envision your work—

JM:
Well, by then—I should say, before we went to Purdue, I taught in the civil engineering department for a couple of years. I taught some of the lower-level mechanics courses, and that's where I began to get my interest in teaching. Of course, at that time, Tech was not really a research institution, it was really a very good teaching program. But I taught there for two years,

and a number of other people in about my same status that were able to get support to go to other universities and work on advanced degrees.

AW:
Yeah, I think Ernie Kiesling—

JM:
Ernie Kiesling was one of them.

AW:
I just spent the morning with him today.

JM:
He was pretty instrumental in convincing me that this is what I wanted to do. And so we went to Purdue and got a master's and a PhD, and about the time I was ready to finish up, Keith Marmion was the chairman and he called me, and at that time, Tech was beginning to make a push for research, and he asked me if I would be interested in coming back to Tech and kind of getting in on the ground floor of civil engineering research. And so in 1966, I came back here and hadn't quite finished my degree and got involved, and it took longer than it should have to finally get it finished, but I did. Kishor came from the University of Texas. Kishor Mehta came from the University of Texas about that time. He was I think one semester ahead of me coming back from Purdue. He was—his background was in concrete design, primarily. And at Purdue, I had studied steel design, so we had a kind of good combination there, so we worked until 1970 planning to do research and testing of concrete and steel structures. And we were instrumental in getting that structures lab in the civil engineering department built—constructed during that period of time. And then came 1970 and the big tornado, May eleventh. And that just opened up a whole new world for all of us. There was a number of young professors in the CE department at that time. Mr. Murdough was still chairman at that time. No, I take it back. He was not, he had stepped down. It was Keith Marmion that was chairman. And Keith took sick and died, and Ernie Kiesling, who was at that time was working down at Southwest Research, he was getting some really good research experience down there, so when we went to replace Keith Marmion, Ernie's named surfaced and he came up here. He'd been here before. We knew him, knew he was a good guy. He came and spent forty, fifty—fifty years, I believe.

AW:
He was there this morning. It sounded, from talking to him and just briefly Mehta, I haven't had a chance to speak with him at length, but I will in January when he's back in town, that that tornado was really in fact a deciding event in terms of development of the interest—

JM:
Oh absolutely, absolutely. None of us had any experience with wind effects on structures and it turned out nobody else did to speak of. There was one little rule of thumb that you used to design wind loads on buildings. You didn't account for the variation of the wind pressures in different parts of the building. There was a lot of misunderstanding about tornadoes, a lot of misinformation out there. The first thing we did was to try to document the damage. So we sent—we gathered up everybody we could find and sent teams out just to look at that damage, take pictures, make observations. Kishor was primarily instrumental in talking to the National Science Foundation and telling us what we were doing and there were a couple of professors that Kishor had worked with at UT that kind of helped us out. And we got a grant to study the damage. Over a couple of years, we very carefully documented, analyzed, and wrote up what we observed for over a hundred different buildings, all different types of buildings, different types of construction and so forth. We learned a lot from that. Also became more and more excited about what we were doing. We started looking at the literature and seeing what was out there, and there really was virtually nothing out there, and so we eventually published that document, and that's the first real systematic documentation of tornado damage in about 1971 or '72, I've forgotten exactly when we got it published. And after that, we started being aware of tornadoes and every time there was one with any significant damage, we sent somebody out to take a look at it. We kind of started in this area—seemed like at that period of time, we were having more frequent tornadoes than we do now.

AW:
Yeah, I think that's right. As I told Dr. Kiesling this morning, I was a young policeman in Lubbock when that tornado struck, going to Tech during the day and working at night, but we had—because we didn't have Doppler radar, they would send us out into the county to spot—and talk about wind direction and rain and hail and all that sort of thing. It was really busy, those several years in the seventies. What—how did you go about studying the damage? What was the method of operation?

JM:
Well, we started identifying the failure mechanisms. Did the roof come off? Did the roof collapse? Did the roof structure fail? Did the lateral support system fail, or was there a lateral support system? We just very carefully, and over a period of time in doing this, over and over and seeing a lot of different examples, we got to a point where we could look at a building and predict how we thought it would fail in a tornado or a hurricane. We eventually, a few years after the Lubbock tornado, we eventually we became interested in hurricane damage. In fact, it was the same year as the Lubbock tornado, there was a hurricane down in Corpus Christi, and I personally didn't go on that trip, but Joe Minor and Kishor went down there, and they got to looking at the buildings down there, and we saw the same kind of failures that we were seeing up here.

AW:
With the straight wind—

JM:
With the tornado winds. A hurricane is basically—you're right—it's basically a straight wind. And so Kishor made his famous statement that we kid him about all the time, "Wind is wind." It doesn't matter whether it's a tornado or a hurricane or something. If you get down to the microscopic look—there are differences, but on a gross look at how they affect larger-sized buildings, basically that's a true statement.

AW:
I've wondered if wind is fractal, and I say this because—one of the things that I do, in fact, what I mainly do and how I got to be doing this job is I'm a musician and writer. When we want a breeze in a recording, you know, you can't record a breeze very well because what you record is the sound of the breeze on the microphone head and all sorts of things, so what we normally hear doesn't work, but we found that you can take the sound of a gale, a very strong wind and simply turn it down. And it sounded like a breeze. Which made me think that whatever is happening to make that sound is—

JM:
Well, the opposite of that is you always hear people talk about in tornadoes and in high winds of any kind, they make a terrific noise. They describe them as a locomotive or a jet plane. So I expect that—if you amplify it in the other direction, that's what happens.

AW:
Yeah, it's very interesting. Very interesting.

JM:
So we started—we had several—started having several objectives. One was to dispel myths.

AW:
Like the vacuum creates—makes the house blow up?

JM:
Right, that was one. And tornadoes suck water out of ponds. There was real interest in that from the U.S. Nuclear Regulatory Commission. At that time, they were afraid a tornado could come over a power plant, a nuclear power plant, and suck the water out of—

AW:
And cause a meltdown.

JM:
Yeah, or the spent fuel storage would cause an explosion. So there was some interest in that. We pretty well put that—and I guess the one that we worked the hardest on was the opening the window. Don't open a window in a tornado when the tornado threats. That was—I've never seen anything so ingrained in the public, that thirty years later, you would still run into people that would say, "Well, the first thing you have to do is open a window."

AW:
Yeah, the—we heard that, all that. What was the other one we heard? Well, there were anecdotes that I always suspected were myths. The unharmed straw stuck into the—

JM:
Yeah, straw perforating a post.

AW:
When I was on police duty there, we were—

JM:
We always looked for those.

AW:
We never found one. Well, so, there was a group of you there. You couldn't all go study the same post—you had to divide up some—

JM:
No, there was—the leaders in the early days was myself, Kishor, Joe Minor, Ernie, and Richard Peterson got involved. He came a little bit later, but he was involved. We had some good graduate students and PhD students. And then as time went by, Kishor, Joe, and I, they called us M cubed, McDonald, Mehta, Minor, we kind of took different paths. I concentrated on tornadoes, Joe got interested in the wind glass. Have you had a chance to talk to him?

AW:
No, because he's down in Rockport. But I will. It'll probably be later in the fall before I get down there.

JM:
I hope you'll be able to. He can tell you a lot of stories, too. And then Kishor got involved in the building codes, and he ultimately became chairman of the wind loads committee, of the ASCE 7 document code, and he was in charge of that for a number of years. In fact, we've had somebody on that committee continuously. I took over after Kishor resigned, and then another faculty,

young faculty member, Doug Smith is still on it today, and he's on the faculty too. We had some really good graduate students, and they were so enthusiastic about doing this work. You know, we would look at school buildings, they were interested in safe areas to put the kids, and we did a lot of study on that, developed some guidelines, developed some techniques for strengthening the buildings as well. But even today, if you go back to recent newspapers, you find there were schools with no adequate safety and some in Oklahoma, where tornadoes are a very dangerous situation.

AW:
And in fact, that one community has been hit three times and fairly recently, it's not like a hundred years ago.

JM:
And they have schools without any hard structures in there.

AW:
How did you as a group of people decide on these? It was just your natural interests that drove you this way or did you sit down and say, "You go out left, I'll go out right?"

JM:
Well, I'll tell you. We had a group that there were no—there was no turf. Every—we knew that we were underfunded, even undereducated in some ways of this, and we had to work together in order to do it. If you look at our early publications, you always saw in some order, McDonald, Mehta, and Minor, and then perhaps some others. Because even though I was writing an article about tornadoes, Kishor and Joe would both look it over, we'd talk about it, review it, and eventually put the three names on it, and sometimes a graduate's too.

AW:
Did it ever occur to you that your being pioneers in wind study was equal to you being pioneers in cooperative work? Because there's not much example for that.

JM:
Well—

AW:
Were you aware at the time that you were doing something different by being cooperative?

JM:
Oh, yes. Yes. We were very much—we were all for one and one for all. We really were. You know, a storm would occur, and we would put our heads—just because I was interested in

tornadoes, that didn't necessarily mean that I was going to go to every one of them, because we had other duties and we'd get together as soon as we could and say, okay, who's free to go to this one? Or who's got a graduate student that you can spare?

AW:
Was there a model for that kind of cooperative work? Or did you have to invent it?

JM:
We invented one. Probably stretched a few rules now and then on—but our goal was to get it done.

AW:
Did you run into opposition elsewhere in the university or even in the College of Engineering, in choosing to work like that? Was there a downside to it?

JM:
No, in fact, we tried to involve as many people in the university as we could. Eventually we had people in the psychology department, the economics department, atmospheric science, mechanical engineering. You see, Kishor can tell you more about this. We had a ten-year cooperative program, sponsored by the National Science Foundation, between Texas Tech and Colorado State University. By then, we were doing full-scale measurements. We had the little test building out in the field there, so we were doing full-scale measurements of wind. This was more straight wind than extreme winds. And Colorado State was—wind tunnel, they were doing wind tunnel—and so, we thought, Look, we need to get together and compare these full-scale measurements with what you get in the wind tunnel, so our little building became the model for calibrating wind tunnels, and it eventually, went all over the world.

AW:
Dr. Peterson had mentioned—I think that's really interesting.

JM:
But anyway, that program went for ten years. We did a great amount of research, we had very good cooperation. We met twice a year, we would meet with—they would either come—the Colorado State people would come over to Lubbock or we would go over there, and we had different programs that we were working on, and there would always be somebody from Tech and somebody from CSU. And when the papers were written, they were the same way for the most part.

AW:
How did that play out, that relationship? In other words, why are we not doing that still today?

JM:
It started out as a five-year program, and at the end of five years, NSF was so impressed that they gave us another five years.

AW:
So part of this was hinged on getting the funding?

JM:
Yes. And the funding was the same way. Half of it came to Texas Tech, half of it went to CSU. And there was never any arguments over who was going to get what.

AW:
If I were to go up to Colorado State, who are some of the people that might be good to talk to?

JM:
About the only person that I know of that's still active up there is John Peturka.

AW:
How do you spell Peturka?

JM:
Let's see, P-e-t-u-r-k-a, I believe, Peturka. He is no longer with the university. There's a wind tunnel facility up there called—let's see—something Peturka and Peterson.

AW:
Oh, he has the—I think Dr. Peterson mentioned that some of those folks had an independent—

JM:
Yeah, they opened up an independent wind tunnel. In fact, CSU doesn't have their wind tunnel facility anymore.

AW:
I just think it might be good at some point for us to have someone who worked with the program.

JM:
John would be a good guy to talk to. I haven't had any contact with him in several years since I retired, but as far as I know, he's still active.

AW:
When did you retire?

JM:
I retired ten years ago.

AW:
Wow.

JM:
I continued to teach for a couple of years, and then I did consulting up until last December, and then I hung it up altogether.

AW:
When you say consulting, consulting in terms of structure—how does a person build a structure that's safe around a tornado?

JM:
Oh, it's a lot of—we call it wind engineering. It can be anything from designing or—I didn't do a lot of designing. We didn't want to get involved in carrying the insurance and stuff that you have to have if you're a designer, so we did more of evaluating third-party evaluations, things like that. I've worked for the nuclear industry. I've worked for the department of energy, highway departments that had wind issues on their traffic signal structures. Department of Energy, I did a lot of work for them. In fact—this is—this address is a DOE standard, it addresses wind, earthquake, and flood, and I was the chair of the wind committee and did most of the work on that. And that's a standard—there's later versions of it now, but that's the standard that's in use today for—

AW:
So any structure that they would be part of including—

JM:
Yeah, would be based on that.

AW:
And would that include things like nuclear reactors or—

JM:
This—not power—non-power plant reactors, smaller reactors. The organizations that use that are these national labs like Livermore National Lab, Sandia National Labs.

AW:
Yeah, I've seen the list of them here, Pantex, Rocky Flats.

JM:
That's them, in fact. I did tornado hazard assessments for all of those, developed criteria for design. This was another one—this was developed as reference material for this standard, but that dealt with the tornado missiles.

AW:
Yeah.

JM:
That's where I did a lot of work. Built the tornado—first tornado missile cannon.

AW:
Really? That's the one everybody wanted to go watch—

JM:
I built the one that was down in the old—in the basement of the old civil engineering building. After I retired, they built this nice facility out at Reese. They had enough money then; we had to steal parts and pipe wherever we could get it and put it together.

AW:
Who are some of the graduate students that stand out in your mind that would be people that would be—folks that we should interview?

JM:
Well, let's see. Doug Smith is on the faculty of civil engineering now. He came here as a—oh let's see, he was an undergrad, and then we convinced him to come back to graduate school and he finally got his PhD and he's now on the civil engineering faculty. He did a lot of the basic research. Let me look at my list here. These are my students. One of them is Tim Marshall. He's the one that I told that had the degrees in atmospheric science and engineering. Doug Smith is strictly an engineer. Let's see, who else—my recall is not very good anymore, particularly when I'm trying.

AW:
I'm the same way. I can remember anything when I don't need it. Otherwise, it's—

JM:
Let's see—I haven't got to the list of graduate students yet. Here we go. Okay, let's see. Jay R. Bailey, that'd be a good guy to talk to. I could give you a contact on him.

AW:
Yeah, that'd be great.

JM:
He goes by Bob. I'm trying to find people that are still working in the general wind area.

AW:
In fact, you can e-mail me those things later.

JM:
Okay.

AW:
And they don't have to be at Texas Tech still. We do travel. I can go see some of them.

JM:
Chris Unanwa.

AW:
How do you spell—

JM:
U-n-a-n-w-a. He's a black fellow from—I believe Nigeria. Brilliant guy. But he's teaching in one of the schools—we could get his contact as well. Dudley McFarquhar, M-c-F-a-r-q-u-h-a-r. He has his own company in Dallas now, it's a—they design façades for buildings. Very successful. Jainming Yin. J-a-i-n-m-i-n-g Y-i-n. He was a partner with Kishor and I for a while in our consulting firm after a while Kishor and I retired. Let's see—Arn Womble lives here in town.

AW:
How do you spell that first name?

JM:
A-r-n.

AW:
W-o-m-b-l-e?

JM:
Mhmm. There's a couple more that I just can't—

AW:
Well, there's no hurry. It'll take me a while to get around to everyone anyway. But I am interested in getting—

JM:
I'll tell you who can probably get you contact better than I can is Debbie—gosh, my secretary. Deborah—anyway, she's Scott Norville's secretary in the civil engineering department. Debbie is her name. I just totally blanked. I know her name as well as I know mine.

AW:
Those are the ones I have the most trouble with. Somebody needs to study that. It drives me crazy. One of the things that I noticed, and I talked—spent a good bit of time talking with Dr. Kiesling this morning about was how different your program has been over the years. And I think in comparison to a group that I did some interviews on a couple of years back, and that is the electrical engineering department, particularly the Crosbyton Project. I look, and it was almost contemporaneous with the growth of civil engineering and wind science, but it flamed out pretty quick and wind science is still going and developing. I think just from an organizational standpoint, there's really got to be a lesson in not necessarily how they didn't do it—because I think their experience is probably more normal in a university setting than yours. What was your ticket to success?

JM:
There's at least two things and perhaps some other factors as well. Kishor Mehta is the best organizer and the best person I know of that can deal with people and get—somehow convince them to get along. He just—and he was—he's been kind of the—particularly in the later years—he's been kind of the project leader on most of these projects that we've had. He was in charge of the ten-year cooperative program and he was able to work with his counterpart there in Colorado State, and he just was able to—he's very calm, he doesn't get excited, he doesn't have any torches to bear or turf concerns. He just wants to get the job done. It's through his leadership, I think, that's really kept this going. And the other one was Ernie Kiesling. He was chairman of the department through most of the early years, and he was willing and able to let us do what we needed to do. He didn't try to put any restrictions on it or any—he was willing to—you know, if we needed to make a trip and needed some funds, he was willing to help us find them, that sort of thing. And then Joe Minor was an excellent researcher and organizer. He contributed in that way. I think I was the guy that was willing to do the hard work. And I was. That suited me better than some of the other things.

AW:
One of the things that I've noticed in the folks that I've asked this question of, is that no one mentions himself first.

JM:
That's true.

AW:
And in fact, every one of you that I've talked to has played down your own role, including Dr. Mehta.

JM:
That's true.

AW:
In the brief visit I had with him.

JM:
He's not—he does not treat us as if he is the boss. Not at all. And he still calls me on the phone today and talks—you know, we talk about what he's doing. He's—I guess you know he's with the National Science Foundation.

AW:
Yeah, which is why I'm having to wait for him to come back.

JM:
He has some restrictions on that. But he has a story to tell, and he has gone in there. I have—this is a position that they bring in a faculty member to—usually, in most cases it's one year. He's starting his third year now, because I think they like him so much. But he got in there, and he's doing his thing up there, getting those guy to talk to each other and keep a cool head, do things—he's very logical, very logical.

AW:
What should I have asked you about that I haven't?

JM:
Well, the organization has changed now. I don't know whether anybody—the people the people who were into the extreme winds and damage, they've kind of been pushed aside for this wind energy. I'm not saying it's necessarily wrong, that's where the interest is right now, it's hard to—you know, we've been studying wind for forty, almost fifty years, there's still a lot of things we don't know about it. There's probably more things, more fundamental things out there in wind energy that need to be looked at, so there's no animosity that is going that way. We kind of hate to see it phase out the way it has, but it has to go on to bigger and better things.

AW:
It strikes me that there's—especially after talking to Dr. Kiesling this morning, there's still one huge thing that hasn't been studied and that is why don't people pay attention to what you tell them about—I'm serious. I was just thinking today while I was talking with him, how many people in America buy a gun to protect their house, but won't do simple things to make their house protected against—and the success rate against a tornado if you do the right things, you can be successful, whereas a gun, you're just going to hurt yourself. What is the psychological or social barrier to be overcome to get people—as you say, still thirty years later, they still want to open a window first thing.

JM:
When we first got in the business, the warning systems were not good. We were not particularly involved in that, that was the weather service, but they have improved that almost to the point of overkill today. We have—where the warnings are given, you can pretty well cut down on the number of deaths and injuries, except for the very, most intense tornadoes.

AW:
But even then, you've got to have someplace to go, and know how to do it, know not to get out in out, all those kinds of things.

JM:
Well, for anything less than EF 3, you go to a hallway or a closet or something, you got a good chance of surviving. It's not a guarantee—of course, that's—we credit Dr. Kiesling with coming up with the in-residence shelter idea, he's worked his whole career on it. Still is. Made a lot of—a lot of progress, but the one thing that you just mentioned, is to get people to do it.

AW:
He mentioned today, it's not just wind but how many times do you read about a rollover accident and people are killed because they don't have on their seat belts?

JM:
Their seat belt.

AW:
And they don't have to build that, it's already—

JM:
It's already in there, all you got to do is snap it together. Or texting, nobody needs to get killed because they're texting if they're not texting.

AW:
Especially if we analyze the content of most texts, we wouldn't find too many important messages.

JM:
Mostly nonsense. I don't know. We've done a lot, and we haven't talked about. We did a lot in educating engineers about that.

AW:
How did you go about that? Other than teaching your own students?

JM:
Mostly with short courses and seminars. Kishor, Joe, and I, we did an annual one-week course sponsored by the Department of Energy up in Emmitsburg [?] Pennsylvania, and it was for faculty members to come up there, spend a week, and we talked about tornadoes, hurricanes, straight winds, and how to design for them and how to go back and teach your students. We did that for a number of years. We would have typically thirty-five faculty members from all over the country. Gosh, we did that for I believe at least twelve years.

AW:
Did other disciplines like architecture—

JM:
Yeah, architects were invited to this, but most architects seem to think they know it all, and they really don't know anything. A lot of them have enough sense to talk to somebody, hire an engineer that does. There's—we were involved with the manufactured home industry for a while. We slowly got them to improve their construction standards somewhat. There's still a pretty big danger from tornadoes.

AW:
Yes, I worked with Upe Flueckiger on an art project. They were building a transportable cabin that's ecologically sound, and they started with a mobile-home chassis. I will never forget that they told me as they took apart the mobile home—they had to take it apart to get to the chassis and use it—they never found one screw in the construction of that mobile home that was structural. There might be a screw attaching a piece of trim to the cabinet, but everything was stapled. No wonder they blow apart in a wind.

JM:
Oh, that was a battle. Just to increase the design criteria by a few pounds per square foot, which made a lot of difference. That was a battle. Getting wind load requirements, particularly down in

Florida in the hurricane zones, people down there fault that. They had a period of time, about thirty years where there were no really bad hurricanes. They forgot. They had some good criteria at one time, and it slowly kind of got washed away. And then after Hurricane Andrew, we started trying to get the criteria, and there was a group down there that just fought it tooth and nail.

AW:
Were these builders that were fighting it?

JM:
For the most part. Builders and building manufacturers, building products. That has improved some. I don't think we're where we ought to be yet. Many of the more recent hurricanes, it hasn't been the wind that's done all the damage—

AW:
Water.

JM:
It's the water.

AW:
And as sea levels rise with the rise of the—temperature, there's going to be more and more and more of that.

JM:
I don't think anybody anticipated what happened in Sandy Hook, for example.

AW:
Yeah, that's scary. Of course, we don't have to worry too much about water here, except in the other extreme.

JM:
Worry about the lack of it. I'm getting more and more worried about that all the time.

AW:
Yeah, me too. What do you see the future of this program, now that it's the National Wind Institute?

JM:
There are—there are still several people that are involved—Doug Smith, Larry Taylor—have you talked to Larry Taylor?

AW:
No, I haven't.

JM:
He's another you need to—he's done most of the—headed up most of the damage investigations since Kishor and I retired. Good man. And he's also in charge of the missile impact facility. He works with FEMA in looking at damage. FEMA makes an assessment on most of these storms to see how the warnings and see how the codes are enforced and why people were killed, where they were killed, things like that. He's been involved in that. Of course, my last major effort was the enhanced Fujita scale.

AW:
Oh, yeah.

JM:
We had used the Fujita scale for years, and it served its purpose pretty well, but there were a lot of weaknesses and things that were not clear, wasn't real easy to apply it consistently, so we talked about it a lot, but when Dr. Fujita, who developed the original one, passed away, somebody needed to step up and do something with it. Kishor and I decided it would be he and I. So he kind of promoted it and I did most of the work, developed the technique that we use now. And I think we've improved it. There was some skepticism when we first presented it, but I think it's been pretty well-accepted.

AW:
Just out of curiosity, why would there be skepticism about improving or making a scale more—

JM:
I think the main skeptics were that it was too simple. They thought we needed some kind of more complex approach to it. And it's basically—what we did is we identified different types or styles of buildings. And it's as simple as school buildings, fast food, gas stations, high-rise buildings, shopping malls, just different types of buildings. We identified the various types of construction that is used on those, and then based on mostly mine and Kishor's vast experience in looking at all this damage, we—I saw we had wind speeds that would cause certain types of damage to these buildings. And we called it degrees of damage. So if I have a—let's say I have a Wal-Mart building, then there's about six or seven degrees of damage. It starts with maybe some shingles blowing off the roof or a window breaks or something like that, and maybe the parapet collapses, eventually the windows break in the building itself, and then it just gets worse and worse until you can get a total collapse. It depends on—some of those things depend on the type of construction, which you take into account. And so by putting together a series of descriptions—

AW:
Yeah, I was looking at some of those photographs.

JM:
Yeah, it's in there. I've got a table in here somewhere. I don't know whether you can read this or not. Maybe your eyes are better than mine. These are the damage indicators. These are I think the degrees of damage and so forth. And so somebody with not a lot of structural engineering training—it takes a little training to be able to do this, and the National Weather Service has developed some extensive courses to train people to do this, but a guy can go out there, and he sees a fire station and he looks at the kind of damage, and in fact, we've got it—

AW:
Yeah, this looks pretty specific to me. Starting with very minor damage right up through pretty serious stuff.

JM:
Anyway, we've got it on an iPhone, so a guy can take that iPhone out in the field and see the—if you go on into that, you can—now I did not develop—I developed the EF scale, but somebody else put it on the phone and did a very good job of it.

AW:
Yeah.

JM:
There's a list of different kinds of buildings. You can click on that.

AW:
Yeah, that's really interesting. Is that something that just anyone can download, or is it—?

JM:
Yeah, it's an app. You can go to the app store and download it. It's free.

AW:
I'll do it. I'm going to do it just to see.

JM:
And then if you need more information, that document in front of you there—

AW:
We should have this at the Southwest Collection.

JM:
Yeah, I bet you do. I would bet that you do, and if not, you can download it off of the wind research website. Because that is the documentation—the official documentation for the EF scale.

AW:
Has anyone—and I'm sure they have, but I haven't heard much about it—is anyone thinking about the change, particularly the threat of tornadic activity connected to global climate change? You know we mentioned earlier than in the early 1970s, we had lots of tornadoes out here. You know, it seems like everything has moved away from that.

JM:
I don't know if the climate has changed or if it's just shifted. I tell people it used to rain in Lubbock. It doesn't anymore.

AW:
But it does rain somewhere else.

JM:
But it rains a lot in other places. There's a lot of talk and a lot of speculation about it, that's more of an atmospheric science problem than it is for a wind engineer like myself. You have to get into the atmospheric effects, and that's a large degree of variables and equations.

AW:
Yeah, and a lot of stuff that people just don't know, I think.

JM:
Oh, you look at the weather on TV and their predictions of what the weather's going to be tomorrow are just literally fantastic. Not always right, but just the fact that they can put it together, and they are continually improving it.

AW:
Although, I've found in traveling as much as I do, you can't much count on the three-day or five-day forecast.

JM:
No, there's so many factors affecting it. They do pretty good on temperatures and cold fronts and things like that that come through. I've been pretty impressed that they've been able to predict general rains, this year, several times, three or four days ahead of time.

AW:
Yeah.

JM:
I'm kind of sort of glad you called me about this. I had kind of put out of my mind what all I had done during the course of my career, and it makes me tired just to think about it. (laughter)

AW:
Well, I think this is a story that needs telling. Our failing as an institution at the archive is that we collect stuff and that's what we do is we collect stuff. But something needs to be done with it, you know.

JM:
If there was one failing that we had, it was we could scrounge up the money to buy plane tickets and rent cars and go out and collect data—

AW:
Can I stop just a moment, so I can put in a new battery?

JM:
Okay.

AW:
These things, I mean, this fits in your shirt pocket and it records at forty-four one sixteen-bit, if I'm recording a wave in Llano, I can get hours and hours for a gig of storage, and it's really amazing. Now I'm sorry, you said that there was one failing—if there was—

JM:
We did not have the resources that we could have used to take the data and do more analysis and more documentation and organization and that sort of thing. We did the best we could, and we cleaned I think the real important things out of it, but there was a lot more we could have done if we had more graduate students and more time. This is one subject that you don't have any problems interesting graduate students in.

AW:
Why is that?

JM:
They're just fascinated with it, absolutely fascinated with it. And of course, the fieldwork we did was a lot of fun. We had the best—because of this—we had the best faculty-student

relationships. We were out tromping through the damage and the mud and rain all day with a bunch of guys, you get pretty close together.

AW:
Well there's—plus a disaster scene has its own kind of energy, I know from being in police work. Here and then later in Colorado, I never went through a tornado up there, but we went through some floods, much like what just occurred, I was there when the Big Thompson flooded in 1973. There's—there is an energy, a heightened level of awareness and everything, when you're dealing with the aftermath of a disaster.

JM:
Yeah, that's very similar to a tornado disaster in some ways.

AW:
Yeah, we had a—of course, in police work we had a very different set of issues that we were worried with, prevent looting—of course, in the very direct aftermath, finding the injured and the casualties, and do something about that.

JM:
Well, it was always critical for us to get to the site of the damages as quickly as we could, but we never wanted to interfere with the emergency people. We always respected them. Sometimes it was kind of frustrating to deal with them.

AW:
When you're talking about quick—you were there when the stuff was still bouncing around, I guess.

JM:
Sometimes we were. I think the closest we ever came—there was a tornado up in Plainview, sometime in the mid-seventies, and the public works director here in Lubbock heard about it and called me about one o'clock in the morning, said there was a bad tornado up there. I got on the phone, gathered up Kishor and Joe and a couple of graduate students and were up there at daylight.

AW:
That's pretty quick.

JM:
Just a few hours—people were just beginning to kind of—if they could stay in their house, they were just coming out, shaking their heads, or they had been gone somewhere and were just

coming back. That was a pretty emotional thing to watch. But we got some really good data. We always said the front-end loader is our enemy, because it moves stuff around and you can get the wrong impression if you don't know where the stuff was to begin with.

AW:
Yeah, and when they start trying to move things around, they do a job of it. Some of it I know in response. We did—well, it was rarely a front-end loader, we did do some digging and—

JM:
Well, if you've got a collapsed house or something like that and you suspect that there's somebody in there, you're going to move it around whether it's a person who's alive or dead. Can't blame them for that. Well, I tell you, it's been a great career. I wouldn't trade it for anything. We worked hard, long hours, but we still were able to meet our responsibilities as teachers, counselors and so forth. It was the most dedicated group of people that you could ask for.

AW:
All right. I think that's a great spot to leave it.

JM:
Okay.

AW:
Thanks.

JM:
Very good.

Pause in recording

JM:
It can wait for a few minutes.

AW:
This is Andy Wilkinson back for a brief addendum about the McDonald-Mehta seminar.

JM:
Kishor and I decided back in about 1972 that whenever we did a consulting job, we would take ten percent of our fees and put it in a—and ultimately, we put it in endowment, and today that endowment, the earnings off it is used to invite well-known experts to come to the campus and

present seminars in the general area of wind engineering, and we've now expanded it to wind energy as well. So we have about three seminars each semester, and we bring a guy in for a couple of days, he meets with the faculty and anybody else, they show him the work that we're doing out at the field site, and then he presents a seminar to the students and faculty.

AW:
That's great.

JM:
We've been doing it for a number of years now.

AW:
How do you administer that? Through the department?

JM:
Through the civil engineering—well, it's the wind engineering department. There's one lady that takes care of it for us. Kishor knows everybody in the world, so he can call up almost anybody and get them to come and give us a lecture. People are actually anxious to come and see what we're doing down here.

AW:
That's really remarkable.

JM:
This group or this organization is truly internationally recognized through the International Association of Wind Engineering, which has conferences every four years at various places all over the world. For the last fifteen years, Texas Tech has always had the biggest delegation of faculty and students. There was one in Denmark a few years ago, and I think we had thirty-five people there.

AW:
Wow. That's a good presence. I'm assuming we would have records of who all has spoken at that, but if not, who is the person that I would talk to make sure we have that in—I'll bet we do, but just to—

JM:
I don't know whether we do or not. I will ask the girl. My mind's blank again. I will ask her. She puts it together every year and has been doing it for the last four or five years. It's a list of who's who in the wind and wind energy areas.

AW:
That would be good to have. That would be very good to have.

JM:
We put out a little—I don't think we've put out the one for this—have a copy left or not. I usually try to keep a copy. Let me look one other place. Well, this is not the brochure for the fall. I guess I don't have any of the old brochures left, but anyway, I'll have her call you.

AW:
Great, because I think that'd be a nice thing to have.

JM:
Very good. And you'd like to have a copy of—

AW:
Yes. No hurry. I can take that and make a copy, or you're certainly welcome to e-mail it. I can get this back to you.

JM:
Why don't you just take it and make a copy and then just send it back. I don't know that I have any need for it anytime soon.

AW:
Let me also—

JM:
This primarily deals with the study of tornadoes, too. Doesn't come close to—as you can see, the scope of this thing is big. We've done a lot of work in a number of different areas.

AW:
We have a release form, too I'd like to get you to sign if you may to allow researchers to have access to your interview.

JM:
Sure. That's the other thing we've done, is we've never copyrighted or tried to hold on to anything. If we presented a seminar—

AW:
That's a conscious decision that you made?

JM:
Yes. I put it in this to protect it. I don't think there's anything in there.

AW:
Yeah, that would be better than putting it in between the two pieces of paper.

AW:
Here is this release form, if you'll just sign one and give it back to me, and there's another one for you to have as a copy. I'll go ahead and put your card in here with this. I'm going to go ahead and stop the tape again.

End of interview.