

Transcript: Risk Matters Podcast 6: How AI is Transforming Safety & Reliability

Jeanne Johns: Hi, I'm Jeanne Johns, and welcome to Risk Matters. It's our podcast on safety and operating risks, where we discuss leading high-hazard industries and share our lessons learned, all in our commitment to eliminate industrial accidents and keep people safe. Today, I'm really excited that we're actually shifting and looking forward to something that's just been dominating the news cycle, artificial intelligence, or AI. There's a huge amount of hype about this new technology, and I can understand why, because it's such a ubiquitous technology with applications and things such as healthcare, basic science research, energy, and manufacturing. And it's also going to have a big impact on both the operating model and the business models of almost every company out there. So today, we're going to break down what do we mean when we say AI and focus on its use in high-hazard industries and how it will help us manage risk as well as improve our reliability and safety. I am delighted to introduce our two guests today, Ron Dowdell and Mike McFarlane, who both have great experiences and perspectives on our subject today. Ron, why don't you introduce yourself?

Ron Dowdell: Hey, Jeanne. First, really excited to be on the podcast today. Really appreciate the invite. I'm Ron Dowdell. I was in the Navy for 26 years. And when I wasn't a pilot or on ships, I was also the Chief Information Officer for Navy N1, which was basically our HR division that also handled training. And as part of that role, I was responsible for digital transformation over 2 years. that moved a lot of our data and also a lot of our work processes to more of modern systems and digital platforms. And excited to talk about this important topic, both you and Mike, today. Thank you, Jeanne.

Jeanne Johns: Yeah, great experience. And I can't wait to hear your contributions to the AI space. And Mike, over to you.

Mike McFarlane: Hi, Jeanne, great to be here today. I originally hail from Dundee, Scotland. I have 35 years experience in the chemical industry, everything from research to manufacturing, site leadership. So latterly for BSF Corporation, I was leading their digital transformation efforts in North America. So that was covering a manufacturing network of around 40 sites. And now I'm helping companies build and develop digital and AI strategies aligned with their business objectives.

Jeanne Johns: That's terrific. Thanks so much, Ron and Mike, for being here today. I think the audience will get a huge amount out of your experiences and perspectives. I'd like to start with a couple pieces of context, because as I frame up this AI wave, I actually think about it as a third wave of digital transformation. I remember the very first one, which was with the internet and search engines, and that just drastically reduced the cost of information. And it seems like ever since then, we've just been inundated with loads and loads of information. The second phase I see is when information transmission became very easy and ubiquitous. And that's when we started seeing Zoom and Teams. And it just actually transformed how we communicate and move information across different mediums. And now we're entering the third phase, which is AI. And I see that as actually a drastic reduction in the cost of expertise. And that includes the time it takes to get to any particular level of expertise. And I think that's really going to be amazing and transforming. The second piece of context I want to share is actually the massive amount of investments that's been going into this technology. In 2024, \$252 billion was spent in corporate AI. And in 2025, it's expected that it's going to be over 400 billion, and that's just for the tech companies. Through 2028, there's going to be nearly 2.9 trillion. Yes, that's trillion with a T. That's supposed to be spent just on data center construction. And so I think that's actually going to really transform this technology. Because when you think about what we get for that level of investment, it's exponential growth in the capabilities. In fact, Frontier AI aging capabilities are doubling every seven months. So before we go into some of the use cases, I think it's actually going to be really helpful to be clear on the terminology, because I suspect I'm a little embarrassed to admit that I kind of use AI mostly as a Google Plus engine right now, even though I know there's so much more it can do. And so I think, Ron, I think it'd be really helpful to our listeners to talk about the differences, whether it's machine learning, large language models, agents, Gen. A, AI. I mean, what does all that mean?

Ron Dowdell: Jeanne, great question. And I think it's important to start by noting that although AI is kind of in the lexicon of the day today, it's a technology that's been around for some time. Now, Mike, I'm not sure if you remember where you were in 1997, but at least my first introduction of this idea of AI occurred when Deep Blue, or sometimes referred to as Big Blue, IBM's first kind of learning machine, was asked to defeat the chess champion of the world, and successfully so. This has been an evolution for some time. There's a couple of terms, like any other technology, as the technology evolves over time, different terms are used to describe their state at a given point in that evolution. So I think the first thing to note is this concept of machine learning. So, you know, Mike, again, we're about the same age. I remember back in grade school programming computers on my Apple IIC computer and telling the computer how to operate. Well, the next evolution of that was

machine learning. Well, instead of giving kind of instructions to a computer, you let the computer learn by itself. You give it patterns to recognize. And through that pattern observation, it can begin to predict and sometimes help with decision-making. And that ultimately is a fundamental technology that brings us all of these technologies today. So machine learning really is fundamental. And you can see it in a lot of different areas, even today, fraud prevention, the machine learning gets a sense of how you behave with your money. And then if there's something that's a little outside of the norm, it will highlight and flag. The second area is this idea of large language models. So imagine a world where you identify patterns of data and then you try to incorporate language into those patterns. So large quantities of information of language are trained with these systems that now can generate content in the form of predicting phrases or providing full paragraphs of language content. A larger category is something called Generative AI. So it's not just language, but also things like imagery or videos can be created with these kinds of tools. And lastly, I think that it's becoming increasingly introduced into the, let's say, the whole the universe of terms is this idea of agentic AI. So not only can these systems predict language and produce language or produce videos or pictures, but they also can do things like read your calendar and identify meeting, build a agenda, and then take notes along the way, all independent of any human interaction. So the impact is quite significant. And I think the important thing to know, Jeanne, and the importance of your question is, If you have a problem you need to solve, it's also important to have the right tool. And if you don't have the right tool, if you're not sure of the right language or the tool to use, then you can be a little bit of an uphill slog, so to speak.

Mike McFarlane: So yeah, I think Ron's covered that really extensively, really well. I'll maybe give you a couple of ads of things that I've seen recently. And particularly things such as hybrid models, that's where a particular approach of AI like machine learning is being combined with first principles, physics and chemistry, to really deliver additional insights beyond some of the Gen. AI approaches. So that's becoming more common. software companies also have the ability now to go out and search multiple AI versions, again, looking at time series data and machine learning, together with the insights from Gen. AI, and integrate that information and give additional insight. So it's very dynamic, you know, staying current with the technology, it's really an ongoing challenge for everyone.

Jeanne Johns: I can see actually how the rate of development's really making these boundaries, these definitional boundaries, sort of start getting blurry. And the pace of change is just phenomenal. I'd like to segue into something a bit, maybe a bit more practical, you know, now that we have a good grounding on the definitions. And Mike, you've saw digital transformation firsthand when you were with BASF. And from my recollection, they were just at the forefront of digital, applying digital tools to

manufacturing. Of course, these were early days before we talked about LLMs and AI. But can you share with the audience your experience with BASF?

Mike McFarlane: Yeah, absolutely. You're right, I believe BASF was really an early adopter of this technology. It came out of Industry 4.0. It recognized really the value, the potential benefit of not just digitalization, but AI, even going back to that time. Now, in North America, I mean, we had a production AI team. One of the challenges at the time was skill sets. There were very few universities or colleges that were building data science capabilities. So we took our production engineers, automation engineers, and we provided them with those additional skills. They then paired up with the plant personnel, went out and, I mean, solved some really great use cases and problems. I recall things like utility optimization was one, and being able to predict catalyst lifecycle was another really important area, and things like raw material balancing. So even at that time, we had teams focused on looking at AI to solve these problems. And as you mentioned, this was long before GenAI became such a big thing.

Jeanne Johns: No, that's fascinating. And it does lead inevitably to the follow-up questions. I mean, where is industry now? I mean, as you talk to other companies and some of your clients, how are they thinking about digital transformation to improve their business?

Mike McFarlane: Great question. And it's moved rapidly. And what I've seen the last few years is a real polarization between leaders and companies that are still figuring out how to get started. I think there's some great use cases around reliability that's moved now from predictive analytics, you know, thinking about when will a piece of equipment fail, to actually prescriptive analytics so the tools can provide some reasons, suggestions for corrective actions. That's become far more common. I think in the area of safety, some great use cases around computer vision for mitigating, for identifying and mitigating risk, both in the areas of occupational and process safety. And obviously with Gen. AI, you know, the whole efficiency that comes from accelerating basic administrative tasks. Some great things going on there right now. I would say the leaders, they've moved beyond thinking about the pilots for the demonstrated value and use cases to system-wide, a new way of working. This idea of having a centralized data source where all the information's been brought into one place, contextualized, that's become an essential foundation from which you can then build apps, build digital twins, and get value from that. I know one company in particular that I would say is the leader in the chemical industry right now, they've done this and they've connected data across all their manufacturing networks and they're getting insights from the plant that is then provided to their operational staff and their personnel to help them with the decision making. And their vision is that when someone arrives to work, whether it's at the start of a shift or at the start of the day, they'll get an insight from the plant

saying, here are the things that we think you should look at today, based on this continuous diagnostic that's been going on in the plant. And I really think that's the future, that's the way work's going to be done in our industry.

Jeanne Johns: That's a great overview, Mike. I think it's really interesting to see how the industry is moving from pilots and isolated use cases to system-wide transformation. The idea of centralized data and digital twins is fascinating.

Ron Dowdell: Absolutely, Jeanne. And I think one of the things that's really important is the cultural shift that has to happen. You know, when you move to these new technologies, it's not just about the tech itself, but about how people work together, how they trust the data, and how they make decisions. That requires a lot of change management and leadership.

Mike McFarlane: Yes, and I think that's where the leaders really differentiate themselves. They're not just investing in technology, but also in people and processes. They're making sure that everyone understands the value of the data and how to use it to make better decisions.

Jeanne Johns: So, as we look ahead, what do you think are the biggest challenges for companies trying to adopt AI and digital transformation?

Ron Dowdell: I think one of the biggest challenges is talent. There's a huge demand for people who understand both the technology and the business. Companies need to invest in training and development to build those skills internally.

Mike McFarlane: I agree. And I would add that data quality and governance are also major challenges. If you don't have good data, you can't get good insights. Companies need to focus on building strong data foundations.

Jeanne Johns: That's a great point. Data is really the lifeblood of these new technologies. Without it, you can't do much.

Ron Dowdell: And it's not just about collecting data, but about making sure it's accurate, timely, and relevant. That requires a lot of discipline and investment.

Mike McFarlane: Exactly. And once you have that foundation, you can start to build more advanced capabilities, like predictive and prescriptive analytics, digital twins, and AI-driven decision support.

Jeanne Johns: So, what advice would you give to companies that are just starting out on their digital transformation journey?

Ron Dowdell: Start small, but think big. Identify a few key use cases where you can demonstrate value quickly, and then build on that success. Don't try to do everything at once.

Mike McFarlane: And make sure you have leadership buy-in. Digital transformation is a journey, not a destination. It requires commitment from the top and engagement from everyone in the organization.

Jeanne Johns: That's great advice. Thank you both for sharing your insights and experiences. I think our listeners will find this discussion really valuable as they think about their own digital transformation journeys.

Ron Dowdell: Thank you, Jeanne. It's been a pleasure.

Mike McFarlane: Thanks, Jeanne. Really enjoyed the conversation.