

REPRINTED WITH PERMISSION

OCTOBER 2020

I-Connect007
GOOD FOR THE INDUSTRY

PCB007

M A G A Z I N E



**RIDING THE ROADMAP
INTO THE FUTURE**



Don Monn

have introduced a photoimageable coverlay to the industry with great acceptance.

Solder masks and consumables are growing, so that's a market we were counting on, and it's coming to fruition. One of my favorite subjects is LED solder mask, or white solder masks, for different industries because of reflectivity and color stability. The automotive industry uses a lot of white solder masks that a lot of people are not even aware of.

Starkey: Is the white mask that you just mentioned a crack-resistant version?

Monn: You nailed it. We were very fortunate when we started looking at this. We went to some OEMs and said, "What do you need that you don't have?" In the automotive industry, crack resistance is very important. But what we weren't aware of, and they educated us on, is not only do they need white solder masks that have crack resistance, but they still require color stability and some high-temperature applications. Simply making it crack-resistant and losing other characteristics wouldn't be acceptable. We had to keep those other good capabilities and make it crack-resistant as well.

Starkey: I can visualize the sort of harsh service conditions that such a product would have to endure. Tell us a little more about what drove the development and what specific problems it overcomes.

Monn: When you talk about crack resistance, there are a lot of different ways to view cracks. Typically, in circuit board manufacturing, when we think about a crack, we think about a surface crack based on temperature, reflow temperatures, and contaminants on the surface, but there are many kinds of cracks. When you're talking about LED boards, a lot of these boards are single-sided with copper or aluminum backs. They don't typically always get routed; some of them get punched.

The punching process, which is especially dependent on the size of the parts, can cause a tremendous strain on the board, the panel, and the solder mask. That was something we never considered initially, but once we learned more about what our customers were doing and how they were doing it, the little light bulb went off in our head, and it was another problem to solve.

Starkey: You're looking at the mechanical stresses involved in fabrication, as well as the stresses induced by a CTE mismatch.

Monn: Right. You phrased it a lot better than I did.

Starkey: As I said before, I know the automotive market is getting more and more demanding, and the service conditions of these materials become more and more and more severe. We've talked about overcoming the mechanical stresses and the thermal expansion mismatches between the coating and the substrate. Also, because it's in an LED application, it's going to get hot, so it has to have high-temperature resistance, as well as to get alternately hot and cold, depending on whether the system is switched on or not. It's also white and has to stay that way. There's not a big advantage if it yellows upon long-term exposure to intense white and UV light.

Monn: You hit on all the major factors. You absolutely spelled it out, and that's why it's really great to have people working in our lab who are a lot smarter than me who can figure out how to create something that will stay white, not crack or break down, and stay constant through the CTE mismatches, as you mentioned.

Starkey: But these people in the lab rely on people like you as the interface between themselves and the customer. You need to talk to the customer, find out what the customer really wants, and to back to the development people and say, "These are our requirements. These are the challenges we want you to address."

Monn: That's where Taiyo is very fortunate to have opportunities to go to the EIPC conference or IPC APEX EXPO and to do interviews with I-Connect007 because that gets the word out. OEMs listen to this and realize, "If I don't talk to my suppliers and tell them what I need, how are the manufacturers going to know what to design and make?"

Starkey: You can't do your product development on spec. You have to do your product development focused on what the market's demanding or what challenges the market is looking for you to overcome on their behalf.

Monn: Exactly, and that's where, instead of me running around the country or around the world talking to one OEM at a time, the conference gives me an opportunity to have access to people and see them.

Starkey: At the conferences, you've become quite famous as a presenter. And I've certainly had a lot of experience of the European conferences where you're presenting to an audience of perhaps 120 top people from the industry who are hanging on every word you say.

Monn: The EIPC conference gives me a great format to speak, and I truly appreciate it. But what I really like is, as you mentioned, there

are some big players and important people who understand the value. One of the things we've always preached is doing things right the first time and doing things with the best materials possible because you can't sustain business doing things a second and third time. The people at the EIPC conferences grasp and understand that aspect maybe more than some others.

Starkey: I've always been very impressed by the two sides. On the one side is the quality of the presenters, but on the other side, the caliber of the audience. It's a well-balanced setup.

Monn: Again, especially as boards get more and more complex, and their material bills get more and more expensive, yields and doing things right the first time become even more important. That message that we've been trying to deliver becomes more relevant every day.

...as boards get more and more complex, and their material bills get more and more expensive, yields and doing things right the first time become even more important.

Starkey: Going back to the crack-resistant white solder mask, how is it printed and cured?

Monn: The nice thing about it is that it's still photoimageable, which is a trick in itself. As far as application, it was very important that we had multiple application technologies, so this product can be screen-printed or sprayed. It works very well, either way. And then it's a simple tack dry, expose, develop, and cure just like a standard photoimageable solder mask.

Starkey: Does the PCB fabricator need any additional equipment to process this material?

Monn: No, sir. It's a drop-in. The one thing about Taiyo America is our product's base chemistry, and our thought patterns have not altered, so if you look at our product line with photoimageable solder mask, the processability, setpoints, and robustness—whether it's white, green, HFX, or solder mask for the Cadillac and Lexus versus entry-level products—the processing is extremely similar from one product to the next.

Starkey: It sounds like a very positive response to a significant market requirement. Thanks for the update on that.

Monn: And with COVID-19 and all of us not traveling nearly as much, it's giving us more time to work on some of these projects, get them right, and get the testing done before we introduce them to the marketplace.

Starkey: That was actually going to be my next question. It's the "elephant in the room" question. This coronavirus pandemic continues to affect us all. You've given us a sort of flavor of how Taiyo America is dealing with it. Do you have any further comments? You did say that you were not able to travel as much as you did.

Monn: That's a great question. Our sales managers and our service group have always been remote. We don't work at the main office. We live where our customer base is and the territory we manage. But when you go to the office, we found that many of the functions done at the facility could be done remotely. Our

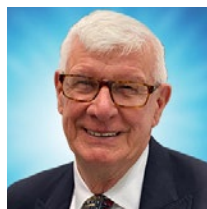
customer service group now works remotely. They set up offices in their homes and have not missed a beat. They're doing everything they need to do from home, so we've eliminated a lot of headcount in the office.

For the people that need to be in the office, all of a sudden, instead of having a small area, it allowed us to double and triple the space between desks, so distancing is much easier in the office. We're doing everything as best we can and staying as healthy as we can. Like everybody, face masks are required in the building. If anyone has to go somewhere where they quarantine for 14 days, we follow the guidelines the best that we can.

Starkey: It's clear that you're taking a very sensible approach to it. In the circumstances, you're certainly doing the best that it is possible to do. Thank you, Don. As ever, it's a great pleasure to talk with you. I hope it's not too long before we get the chance to meet face to face again.

Monn: As soon as that works out, we'll get together and talk about it.

Starkey: That sounds good to me. Thank you.
PCB007



Pete Starkey is technical editor for I-Connect007. Based in the UK, Starkey has more than 40 years experience in PCB manufacturing technology, with a background in process development and technical service. To contact Starkey, [click here](#).

jobCONNECT007
Companies seeking talent with circuit board industry experience post their jobs with us.
jobconnect007.com

I-Connect007

GOOD FOR THE INDUSTRY



FREE SUBSCRIPTION



myconnect007.com

EDITORIAL CONTACT

Nolan Johnson

nolan@iconnect007.com

+1 503.597-8037 GMT-7



mediakit.iconnect007.com

SALES CONTACT

Barb Hockaday

barb@iconnect007.com

+1 916 365-1727 GMT-7



www.iconnect007.com