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Roundtable Discussion

Collaboration Leads to Discovery of Efficiencies, Growth

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Koh Young and Matric Group:

Collaboration Leads to Discovery of Efficiencies and Growth

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Meet the Participants

Ivan Aduna - Global MES manager, Koh Young

Ivan Aduna is a Global MES manager at Koh Young Technology, a leading 3D measurement-based inspection equipment and solutions provider for the electronics industry. He earned his Mechatronics Engineering and Project Management degrees at the Universidad Panamericana in Guadalajara where he focused on embedded systems, algorithms, and low-power solutions. From there, Ivan applied his software expertise at Intel where he designed and executed test plans and use cases to refine 5G network controllers on both Windows and Linux environments. His foray into the Internet of Things began at Dextra Technologies where he developed embedded software systems for the automotive segment and telemetry-based tracking solutions. Today, Ivan leads the Koh Young smart factory integration efforts for electronics manufacturing. His proficiency, mixed with theoretical and practical knowledge, positions him with the ability to understand, adopt, and implement software advancements from both the user and supplier perspectives.

Doug Bevier - Senior Manufacturing Engineer, Matric

With 29 years of experience in the electronics industry, Doug is about to reach a significant milestone in February 2024 as he enters his 30th year with Matric Group. Throughout his career at Matric, he has served in various roles, including THT Assembler, Maintenance, Process Technician, Training Coordinator, and SMT & THT Production Supervisor. In 2018, Doug transitioned to the position of Manufacturing Engineer.

Patrick Stimpert - VP Operations, Matric

With over 25 years of experience in manufacturing, overseeing facilities, operations, and distribution services, Patrick brings a wealth of expertise to Matric Group. Over the past 6 years, he has successfully implemented the TPS (Toyota Production System) and the Gemba process, enhancing the capabilities and efficiency of Matric's production staff and services. When faced with challenges, he lives by the motto, "During a crisis, it's crucial to focus on solving the problem rather than wasting time rearranging deck chairs like on the Titanic."

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ROUNDTABLE DISCUSSION

Doug Bevier
Matric Group

Patrick Stimpert
Matric Group

Ivan Aduna
Koh Young

Nolan Johnson
I-Connect007

Faced with ever-increasing sales and production complexities, Matric Group responded by challenging themselves to increase efficiencies and yields on their manufacturing line. Achieving their goals included working closely with Koh Young to bring inspection up to cutting-edge capability. In this roundtable discussion, Nolan Johnson gets the whole story from Matric's Patrick Stimpert and Doug Bevier, and Koh Young's Ivan Aduna.

Nolan Johnson: Welcome to this I-Connect007 roundtable discussion, a case study on process optimization with Koh Young and Matric. With me, I have Ivan Aduna. He is the Global EMS Manager at Koh Young; Patrick Stimpart is the Vice President of Operations; and Doug Bevier, Senior Manufacturing Engineer at Matric. Gentlemen, thanks for joining me.

Patrick Stimpert: Thanks for having us.

Ivan Aduna: Thank you very much, Nolan.

Johnson: Doug, Pat: what's the specialty of Matric?

Stimpert: We're a contract manufacturer. We have very few OEM products that we own ourselves. So, we have to be successful in building other folks' components. We started in the underground mining business and have grown that business and diversified to where we are, doing everything

from flight to NASA flight to industrial and commercial. All of those different electronics can be built here. The business started with two gentlemen in a basement, and we are looking at about an $80 million company this next year.

Johnson: You have a facility in western Pennsylvania. Are there any other facilities?

Stimpert: We have one in Freeport, which is south of here (in Pennsylvania), and we have an engineering location near the Pittsburgh airport, which is our wind turbine business and is an international business.

Johnson: Let's start at the very beginning. Matric was looking to solve some problems, to make things better. What were they?

Stimpert: It really kicked off when we installed the latest, greatest generation Panasonic line, an up-step from where we were with our original equipment. We found out very quickly that you can build a lot of stuff, and that's great, except when you build it wrong. Then, you can build a lot of bad stuff really quickly as well. So, we started a continuous improvement project to make sure that we didn't put ourselves in a position that I call "Mount Rework," and that we remained profitable, protected our margins, and achieved all the things we wanted to do. This is where our ROI project came from.

Johnson: That is one of the challenges, isn't it? You can speed up your lines and increase your capacity, but if things go wrong, you just make a lot of bad work a lot faster. How did you tackle this? What was your approach?

Stimpert: Well, early on, we had our post-AOI's place. We felt the need to get to a single platform, try and simplify the sophistication we already had rather than bringing more sophistication in, to get all our Class 1, Class 2, and Class 3 calls identical across the organization. This was quite a challenge as we grew rapidly. We needed to stop and fix these things. We spent a lot of nights and a lot of weekends figuring out how we were going to

make the Panasonic really go, and we started looking at how we could start bidding business that we couldn't bid on before because of these issues.

Johnson: So, at what point in this process did you decide to reach out to Koh Young?

Bevier: We had one of Koh Young's first-generation systems prior to the Panasonic. Then we got our first inline post-reflow AOI. The software covered a lot of the different components and assemblies that we were doing, and it was doing a good job. So, when we got new platforms, improved software, and improved enhancements with improved offline and online capabilities, it was a no-brainer to continue on with the Koh Young line.

Johnson: Ivan, were you involved in this particular challenge?

Aduna: At this moment, I was not involved because I'm part of the after-sale process. Once they have the machines in place and have everything they need, that is when they start asking the interesting questions: how can we achieve all these things? How can we extract the valuable information that is stored in the machine so that we can do more things to improve efficiency or tackle other items based on their current pain points? Once they set everything up with regard to the post-reflow AOI and started to identify the benefits of having a pre-reflow AOI, things got interesting. Basically, this is reducing waste, reducing scrap, and optimizing the line fully. That is where I came in.

Stimpert: The first year of my coming on board here was fairly interesting because I was new to the contract manufacturing world, PCB placement and SMT placement lines. Nobody knew me. We were in Chicago at the Panasonic facility. Koh Young and Panasonic already have a strong relationship; there was this whiteboard drawing but everybody else was off looking at fancy equipment. So, I decided I was going to draw on an SMT line, and I just started asking questions.

One of their first comments was, "You're getting 12%, 15% placement time.

You guys are doing well in the industry." But I'm thinking, "What? You don't even get to play baseball if your average is that bad." At the end of the day, it was down to, simply, that we had to do something different. That led to a conversation in San Diego. We had pulled Koh Young in at that time and told them this was the direction we were going. We're going to increase the speed. We need really good throughput. Our first pass yield needs to get in the high 90 percentile for us to maintain margins. And then Matric could go in and explore faster-moving PCB products and PCB placement products that we couldn't bid on before this new machinery. That's how it started and how it all took place.

After we got the post-AOI taken care of, I saw a whole bunch of product manually leave the post. I asked about it and was told that the board had to go to a visual inspection because there was a deviation. Koh Young can't pick up the shadowing. At that point, I had some colorful words because all I am thinking is that we're handling this again, and all I was seeing is margin erosion. Coming out of the rapid manufacturing pace of LED manufacturing, we'd lose money if we started to handle everything over and over again at one cent a widget. So, that was the next thing, what are we doing for deviations? And that was probably the hardest thing for the industry to stomach, grappling with the fact that I didn't want it to go through my post with me calling a deviation. I don't want to have to document it on a piece of paper. I want to get it in the Koh Young software, and then I do not want to have to handle it again.

Koh Young then said, "You know, you have to make sure your rotations are good." And I'm thinking, "how do we do that?"—especially in the world of 'you can't find employees.' So, I said, "Sell me more AOI machines and this time I want them installed before the oven." That's where we came up with the pre-design. Koh Young started saying yes to some things that were very important to us. And that is when we began a really strong relationship with them.

Aduna: Yes, and that's when I started to get involved with my team as well,

not only on the inspection side, as Patrick mentioned. There were some really big challenges to do with shiny components and other elements, gaps that we needed to fill, and with the potential of software being able to resolve some of the things that they were trying to automate. At the very end of the process, they were spending a lot of time on manual processes that were not adding value. This was one of their major issues. Coming up with very creative ways to fully automate the process, things that we had not done in the past, required that we get more creative with our software and our flexibility. That is when this really started to ramp up, leveraging the software in some of our tools and the pre-reflow concept in order to maximize the throughput of the line.

Johnson: You are touching on the three big challenges that all manufacturers continually grapple with: faster, better, cheaper. Ivan, from your perspective at Koh Young, how commonplace are these challenges for contract manufacturers?

Aduna: These are certainly challenges experienced by all manufacturers, but every single manufacturer is different, even though they might build similar products. Sometimes, we see different challenges just because of the way the line is set up. In this case, Matric knew exactly where their challenges were. One of the interesting parts about Matric is that they were focusing on optimizing and reducing costs. They knew that they had a lot of waste in certain areas, and they really needed to maximize the output of the equipment. That is key. Manufacturers who genuinely want to get the most out of a tool, whether for pick and place, pre-reflow, or something else, they can completely change the landscape of the manufacturing line just by asking the right questions as Patrick did, or having the right mindset about fully automating the whole process, reducing the time that they're spending in non-valuable areas.

Bevier: One of the big things to elaborate on is that we made the investment on five lines, five post AOIs and ended up with four pre AOIs. To mon-

itor those machines and make sure that I'm not sending anything forward or stopping the production lines is a nine-person operation, and Koh Young had a solution—real-time monitoring through their case smart enterprise software. Now we have one person whose full-time job it is to watch these nine systems simultaneously making sure nothing is going off the rails. Before we had nine associates doing it. That was a huge second step, and they had a solution for us to remain profitable.

Johnson: That is huge! About getting creative in coming up with solutions, what were some of the creative things that Matric and Koh Young did together to put this in place?

Bevier: Again, the integration of the real-time monitoring, one-person laundering nine systems was one. We also wanted exception reporting. Patrick elaborated on that in the customization that Ivan ended up creating for us, where we said, "We know this part has a shadow every time, and we don't want it to be considered a false call and go into the 'bad' sorter. We want to look at it beforehand and say that we've got a good board without that potential second touch in a second visual inspection on the back-end side." That was number two. And then we asked them to make us a customized job summary report that showed the quantity of the job, how many were run on the job, and the top defects from each job. These were all integrations that were outside the standard scope, but we told Koh Young they were important to us. That is the information that our quality department wanted in front of them.

Aduna: Just to put a little bit more context into what Doug just mentioned. You can imagine there are a lot of manufacturers out there that have a specific idea of how machines should be operated and how information should be input into systems. You can imagine, for example, the scenario where we go in and see a line with multiple operators entering information manually into the system. Here, we see a lot of potential for automating a whole process by single clicks or, even where the operator doesn't need to

do anything at all. We know all the potential information we can provide to them. You can just imagine these reports being created manually by the operators on that line, and now, the capability of the machines basically outs that information directly into their systems, removing data input errors from manual entry, and eliminating the time spent previously needed to input the data. So, there are a lot of little things that add up through automation and implementing this kind of solution.

Stimpert: For me, I kind of pull back a little bit and look at everything. There were some key times when I knew it was going to be successful. I have a philosophy that you don't waste time rearranging chairs on the sinking Titanic. You go fix a problem. So, we just kept fixing things, even when it came down to the issue of labor. Doug said, "We have the labor issue. Nobody's maintaining long-term labor right now. And with everybody who is coming in, there is a full-scale learning curve." Expecting the same results from 5 or 10 years ago was just not realistic. So, I said, "Okay, we're just going to fix these things. We're not going to anticipate that every operator, every day is going to do everything correctly. So, let's automate as much as we can, and have checks and balances on everything we do, and let's not expose our operators to doing things badly–because even though everybody's coming to work to do the right thing, with just one rotation on a 15,000-parts reel, a lot of bad can happen quickly." We simply said, "let's fix that."

Johnson: Are you at a place where you can measure the changes to your operations? Can you quantify the optimization from this?

Stimpert: When we started over six years ago, we moved our cost of goods labor by 46.5% improvements. So, we took 46% of the labor out of the SMT throughput, which was really good because we could use that labor elsewhere. We started cross training, teaching them Class 3 hand soldering. That was very important for us to get to where we are today. And we're maintaining that, and we continue to improve our Cost of Goods of labor.

Once we got really good data out of Koh Young, and once pre's and posts were dialed in, moved from roughly 76% to about 98% first pass yield.

Johnson: That's a nice bump.

Stimpert: Yes. And in the industry, if other people aren't doing these things, they're basically whistling through the graveyard. That's where you have the out-of-box failures, and the customer CARs, and all these other things that erode margin. At the end of the day, if all of our optics do what they're supposed to do and our quality checks and balances are in place, we get very few returned out-of-box failures coming back to us. That's where I feel this team has done a fantastic job. I'm so happy to be around these really smart people. It's made me feel younger. My continuous improvement flame keeps burning higher. I'm really pleased and what we have accomplished here.

Johnson: Did you achieve all the objectives that you started with?

Stimpert: I'm a continuous improvement person so no. I still have more work for Ivan to do where we need to push more optics on other equipment. There are some other things we need to better understand. And there are some other manufacturing ideas that we have. We are going to try and push Koh Young even further.

Johnson: Ivan, I want to circle back to you because there was quite a bit of discussion about customizing and integrating the Koh Young equipment into their processes at Matric How common is that?

Aduna: It is more common than you think. Many people think that being in SMT, much is standardized nowadays, especially with the trend that there are standards being developed for nearly everything that is being manufactured. But the reality is completely different. About 70% of manufacturers are not standardized. We now seem to be seeing a bump up in manufacturers who are now standardizing some of their processes. But the reality is that most of the manufacturing lines are highly customized and

that's okay. But there's always a space for standardization.

With Matric, that is what we did, we standardized the way that we report all the information. At the very end, there were many things that were achievable, especially regarding software customization. But not every single supplier, vendor or manufacturer is able to adapt their highly customizable systems. That is the key thing we were able to achieve with Matric. That's where or our team on the data side plays a big role. Our ability to customize unique and specific solutions for manufacturers surprises them. Koh Young is able to deliver, to do so quickly, and whether it is a more standard or custom solution, we are prepared to adapt to our customer's needs.

Johnson: Speaking of customer needs, Patrick, Doug, did you find that your relationship with your customers has changed now that you have these added efficiencies?

Stimpert: What we've set up here—the manufacturing floor sells itself now. That's a big statement in the industry. When quality or manufacturing engineers from OEMs draw up here and want us to do some PCB work for them, it is really fun taking those folks around to the building here. It's kind of funny because we are out here in the middle of nowhere in western Pennsylvania. You have to go past farms to get to us, and then you drive up to this place. We call it our own Silicon Valley of Western PA. We catch a lot of very sophisticated OEM customers off guard who is just out to check the boxes of seeing three or four manufacturers in the U.S. We catch them off guard in how much further we're willing to push our technology than others they have seen.

It is a lot of fun doing tours now because we actually show them the War Room concept and one person making all the calls and being able to say, "our next step is to have standardized classrooms across all the facilities." Our salespeople can sell at all of our facilities, not just this one. All that stuff has been really fun to be part of.

Johnson: What have you learned about your business through all of this?

Stimpert: It's been fun working with the premier vendors, the Panasonic's, the Medtronics, the Koh Youngs. The meetings have generally started out a little weird because I go in saying, "This is what we're going to do." And I will get the industry standard response, "You can't do that." It has been very interesting to see somebody that is an outsider to this business come in and fundamentally change the contract manufacturing world for the better. And we are now in a position to compete offshore. That is a very bold statement.

Johnson: That is a very bold statement. That leads into my final question. What advice would you give other contract manufacturers here in the U.S. based on what you've just learned from this project?

Stimpert: Be careful about the continuous improvement people you put in your building because a true-norther may not be flexible enough to take on really big challenges like this. I was very happy during this process to have a quality person and manufacturing engineers who understood that we have to make money at the same time we are achieving these other things. I have vendors that know we have to make money. We pride ourselves in never, ever being confused with a nonprofit. It is about making a product you are proud of, employing as many local people as you can, and growing the business. So, if you're a contract manufacturer and you're worried about competing offshore, you've got to become automated. You just have to, and then you can outperform them. With tariffs as they are, and freight instabilities, and the cost of fuel, and the myriad of other things happening that are not in your control, you should be able to compete with offshore right now and not feel bad about that price.

Johnson: Gentleman, thank you for taking the time to talk with us to today, we appreciate your time. Thank you.

Aduna: Thank you.


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