

XIA 2022, PANEL CATEGORY: "HAND GUARD" BY ALTENDORF

The **XIA-Xylexpo Innovation Award** in the **panel processing** category was assigned ex-aequo to two solutions to the same **safety risk on sliding table saws** (a.k.a. squaring machines), "with different approaches but equal results" (quoting the jury's motivation). This article illustrates the "**Hand Guard**" solution nominated by company **Altendorf** based in Minden (Germany).

Altendorf Group is a global market leader in the production of premium sliding table saws and edge banding machines. The company was founded in 1906 and enjoys strong brand recognition around the globe. Their latest innovation is the "Hand Guard" safety assistance system for sliding table saws, a globally unique, AI-controlled and certified early recognition system with two cameras that helps protect people, machine and material. Innovation is part of Altendorf's DNA. The machine building company is expanding its competences to emerge as a safety solution provider for manually operated machines with a certain danger potential across many industries, transferring the "Hand Guard" technology to various applications.



I had the pleasure of interviewing **Ansgar von Garrel**, Head of Marketing at Altendorf Group.

To begin with, could you please give us a general description of the system and how it works?

"Hand Guard" is a sliding table saw with an **integrated safety assistance system**. It helps to avoid injuries with sliding table saws. It is globally the **only** certified safety assistance system for sliding table saws that helps prevent injuries, works with artificial intelligence, is GS-approved, can handle all materials, including wet wood, aluminum and plastics, and works with trained gloves.

"Hand Guard" is the world's first and, so far, only approved safety assistance system that works with **cameras and AI-based** hand recognition and thus defines a new safety standard for sliding table saws.

By using cameras and hand recognition software, it is possible to detect dangerous situations in time to completely prevent injuries. In contrast to other systems on the markets, "Hand Guard" is the only system that can handle conductive materials such as aluminum, plastics, wet wood or conductive coatings."

How did the idea of developing such a system arise?

"In Germany alone, there are up to **120 reportable accidents happening in connection with sliding table saws every month**. This is a huge problem, both for our traditional customers, the small to medium woodworking shops, as well as for larger companies with industrial production setups, which have in force safety officers to reduce possible work-related risks.

Therefore, we always had the idea to develop a safety system for sliding table saws. For us, it was clear to develop a system that would be 100% safe, not mitigating injuries, but **preventing them completely**.

We are very happy and proud to be the only safety assistance system for sliding table saws to be certified by the Bghm, the German health safety authorities. Also, we have been awarded as the only



system with the official German Award for Occupational Work Safety. The renowned German Fraunhofer Institute carried out a comparative study on how safe camera-based and capacitive safety assistance systems for sliding table saws are in different working speeds. The result is very clear: Only the camera-based system was able to avoid damage to the test specimen at all speeds of approach. Another important point to add is that it was important to us that "Hand Guard" should be able to process other materials – like other sliding table saws – such as aluminum, wet wood or plastics. Due to the different nature of the materials, this is only possible with a camera-based system.

How does your vision system work? How was it developed so that it would recognize the hand with certainty?

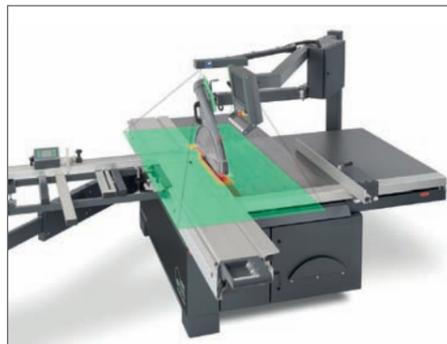
"The camera-based system that is used by "Hand Guard" monitors a defined area. When a hand comes into this area, it is recognized as a hand. From a library of more than half a million hands and hand forms, Artificial intelligence combines all these characteristics and **identifies any hand**. This works like a collision mitigation system in a car: a dedicated area is constantly monitored (road). When a possible dangerous situation occurs (animal or person on the road), the car initiates a reaction (stopping the car).

Therefore, even with higher working speeds up to 2m/s or slip movements, the hand can never come too close to the saw blade.

Upon activation, the saw blade is very precisely driven down through a ball screw spindle and a servo motor. It does not take more than 10 seconds for the system to be ready again. There is no damage done to neither saw blade or the system itself."

Were there any obstacles in the development, and how were they overcome?

"Main obstacles where within the **process of certification**, since there had not been an official safety standard for safety assistance systems for sliding table saws before. This process was long and intense, but we are even more proud to have the first system on the market to have gotten the official certification."



What kind of mechanism drives the retraction of the saw blade? Why has it been chosen?

"The ball screw spindle in combination with a servo motor enable a very fast and precise retraction of the saw blade, even for tilted sawblades. It also enables the system to be working again after 10 seconds. Using this technology, there is no wear and tear on any components through the driving down process."

Are there any patents? Covering what aspects?

"There are **numerous patents** on the entire principle of visual hand recognition in combination with identification of a hand, as well as on the activation of the driving down mechanism. Therefore, this principle cannot be copied."

What is the estimated spread? How many dimension saws will mount it?

Our vision is that one day, "Hand Guard" will become the airbag or seatbelt for sliding table saws. Our system can help to avoid all these horrible accidents that happen every day all over the world. Losing a finger or a hand can be a life-changing event. Our mission is to help save all these fingers and hands."

What developments are possible, and which are already in planning? In particular, do you foresee the application of the system to other kinds of machines?

"First of all, the "Hand Guard" technology is not closed, but it can develop. Depending on what is being taught, the system can recognize other body parts. For example, it has been trained on a special pair of orange gloves. These can be used in working with "Hand Guard" where it is permitted. We are currently exploring options to transfer this technology to other application scenarios where manual labor on potentially dangerous machines is involved. There is a huge potential in other industries."

To provide as complete a picture as possible, I thought it would also be interesting to hear from someone who is already using this technology. So, last May 23, I visited UniFor in Turate (Como), where one of Italy's first samples of sliding panel saws with "Hand Guard" system was installed in February 2022. I was accompanied by **Jessica Tansini**, a salesperson of Albricci in Cesano Maderno (Monza Brianza), Altendorf's exclusive distributor in Italy. Over the past 18 months, Albricci has sold 37 "Hand Guard" machines, 28 of which have already been installed.

Design and production culture are the foundations of **UniFor's** strategic design. The company is part of the Molteni group, which includes Molteni&C (living and kitchen furniture), UniFor (solutions for working spaces) and Citterio (partition walls and office furniture).

We met **Luca Pina**, who coordinates production and guided us on a factory tour.

"Series production is executed on the squaring-edgebanding machines that can deliver a full set of furniture for a large office in three to four weeks. The joinery department – where the sliding table saw is installed, together with other traditional machines like planing machines, routers, band saws – is dedicated to small custom orders, such as executive offices, board or meeting rooms."



Why did you choose to purchase Hand Guard?

"The topic of work safety – Luca Pina said – is essential for UniFor, we make significant investments in accident prevention every year. Traditionally, most accidents involve the hands of joiners. This new machine prevents this kind of injury.

Currently, there are two solutions to this problem: one is based on electric impedance differential, so it requires a contact between the hand and the blade, retracting the blade as soon as the finger touches it – which means that the injury has already occurred, but you minimize the damage; therefore, it is not a fully effective system. Instead, Altendorf has created a system that avoids any contact between finger and blade: when a hand gets too close to the blade, without touching it, the blade is retracted under the worktable, completely avoiding any injury."

What's the difference between Hand Guard and a traditional squaring machine without this safety system?

"The Hand Guard sliding table saw really changes the way you work – Tansini said –. We know that expert craftsmen have good and bad habits learned over the years, when they got used to pushing parts very close to the blade with bare hands. Operator training on a standard sliding table saw takes one day, while it is longer and different with "Hand Guard", because, to avoid getting too close to the cutting area, you use additional accessories such as grippers or workpiece pushers."

"Using such accessories – Luca Pina added – implies slightly longer working cycles, but safeguarding people in the workplace is essential for our company. Therefore, we opted for a machine like "Hand Guard".

In conclusion, I would like to stress two key elements mentioned by all the people I met, and underline how closely they are interrelated: work **safety**, considered as an investment rather than a cost; and **social sustainability**, combined with economic and environmental sustainability, the latter probably better known and for a longer time. Sustainability is another category of XIA22: the winner of this category will be featured in one of the next issued of Xylon.

by Matteo Simonetta ■

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