



Dicing Technologies Workshop

19 May 2016 – Mercure Hotel Norwich

On a bright and sunny day this CPD accredited workshop covered topics from the basics to the advanced and new technologies in dicing. The event was sponsored by Micross Component, as they were enabling a visit to their facilities based just 10 minutes walk from the venue.



Delegates from across Europe arrived to fresh tea and coffee, making themselves comfortable for the workshop ahead. A quarter of whom admitted no experience of dicing making this the ideal place to learn from the advanced users and international speakers in the room. The room made some of us feel young again as it had a classroom feel.

Andy Longford with this IMAPs secretariat, Event Host and PandA Europe CEO hats on started the proceedings with an introduction to the workshop and the Basics of Dicing, explaining the different dicing technologies, their advantages and disadvantages. This was an interactive session with plenty of questions for the audience too, testing their knowledge and understanding.

Blade Technologies were covered by John Govier from Inseto presenting a guide on the crucial stage of selecting the best blade for the application. How to consider blade composition, edge geometry and binding medium was the main emphasis but also the compromises over cost, blade life, size, vibration and cut quality were reviewed. It was interesting to note that in his experience no two customers use the same blade, emphasising the need to customise blades to achieve best results.



After a networking break and a chance to stretch the legs and look at the Micross display Christoph Epple from Disco presented a discussion on equipment selection and how wafer thinning and dicing are essential processes for manufacturing semiconductor products. There was an in-depth description of a fully automated, all in one machine which included blade sharpening and the use of multi spindle cutting blades for dicing arrays. It also featured a unique oscillating blade that reduces loading.

Laser cutting equipment capability was described and how pulse and beam direction can be controlled on multiple beams to produce multiple serial cuts using this non-contact dicing method. The use of a protective coating that prevents particulates settling on the wafer was discussed, being key point for this technology.

After lunch all the delegates took the opportunity for a stroll and guided tour of the newly refurbished and expanded Micross Components facility. The tour showcased the many capabilities and attained



standards and approvals which credit their impressive customer base and investment in technology. The visit raised the energy levels and complimented the learning from the morning session.

For the afternoon workshop, Andy Longford started with a brief recap of the morning session before going into new dicing technologies. The session provided a brief insight into how laser cutting, stealth dicing and Thermal Laser Separation (TLS) can be used to provide efficient specialised singulation of wafer based product. One of the points raised in particular was how to prevent micro-cracking and remove slag from the cut streets. New patented technology providing multi beams at different focused cutting depths was introduced. This reduces the heat affected zone (HAZ) compared to a single beam (unless cutting with low beam intensity). TLS a new technology which creates a breaking stress by running a hot source and then a cold source before cleaving to break up the cut. This is a very fast process and can even cut circular patterns.

The paradigm technology of Plasma Etching was further presented by Richard Barnett from SPTS covering Plasma Dicing. This very effective and efficient method enables etching of identified patterns using photolithography. Careful setting up and optimisation of the process is critical to maintain die strength after etching. The benefits are very high, adoption of the technology gaining momentum with the hardware and process now readily available.

Following another network break we went into the final session covering applications. Dail Hazell from Micross Components presented results from trials conducting using blade technologies. In his case study there were metallised tracks in the sawing streets and he covered the challenges and solutions for preventing chipouts and removing metal and debris from the cut streets. Results from extensive trials using different feed speeds, cut depths and Kerl were presented. Dail emphasised how continuous discussions with the customer were essential to ensure the expected quality was achieved.



The next application was by Dick van der Linde from BESI on the Fico Sawing Line (FSL). This solution has multi robots making it possible to load, align, cut, clean , dry, inspect and sort into JEDEC trays. The processes can be done in parallel. An ASSYST feature informs when the blade needs changing. The components are held using bespoke vacuum tooling as the cutting is done from underneath so all the debris falls down into bins. The powerful vacuum and optimised tooling overcomes the challenges of wafer warpage during cutting. Inspection is done by multi angled cameras which can inspect many devices at a time.

The final presentation for the day was by Christopher Johnston from PlasmaTherm on reducing manufacturing costs with plasma dicing. An impressive 44% cost reduction can be achieved by using Plasma Therm. Redesigning dicing streets even by 2um significantly increases the die count on a wafer. Hence, when comparing the cost of different dicing technology the overall value stream cost including wafer costs should be considered. Viability and when plasma etching becomes cost

effective depends upon the volume of wafers being processed. Christopher provided a useful tool which can be used by the delegates for calculating the cost benefits based on volumes and customer requirements.

Andy Longford ended the workshop with a thank you to all the presenters and delegates for their time, knowledge share and support to make this another successful IMAPs event. All presentations were made available electronically via Dropbox. The final message being- no one tool fits all, hence there is always a need to remove trial and error by understanding the application and reviewing it with the supplier.

Finally, from the IMAPs committee a big thank you to Micross Components for their support, sponsorship and hosting the facility tour.

