

A Jig-less Ejector Needle Design for a Robust Die Attach Process

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I. OVERVIEW

- Ejector needle holder assembly is a primary tool used to separate the individually sawn silicon die from the wafer tape through a synchronized sequence of vacuum supplied to the wafer tape and an upward movement of the assembly.

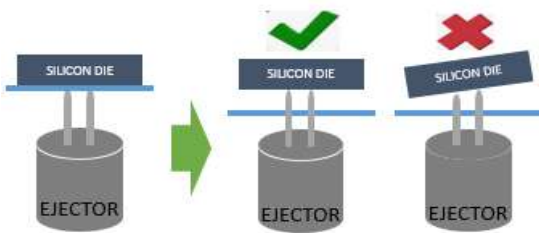


Fig. 1. A simplified illustration of ejector sequence

- The height of the needle from the holder should be consistent/constant during the ejection movement to properly isolate the silicon die.
- Imbalance needle height may contribute to gross assembly rejection such as die cracking and miss-picking of silicon die.

III. PROCESS AND PACKAGE DESIGN SOLUTION AND IMPROVEMENT

A jig-less needle holder design minimized the time consumed by a technician when replacing a worn-out ejector needle through incorporating an aligner instead of jig for the planarity of needle to avoid taking-out the assembly when needle replacement is required. In Fig. 3A, the ejector needle is inserted to the allotted needle slots wherein it is design to cater single or multiple configuration. Upon insertion, it is fastened by a “set screw” as shown in Fig. 3B to hold its place. The aligner, in Fig 3C levels the height of the needle when it is inserted. The dowell pin in Fig. 3D is used to avoid movement in the assembly during replacement.

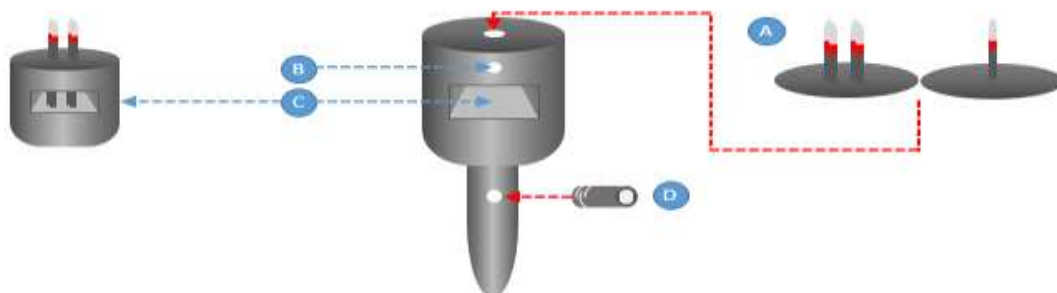


Fig. 3. Jig-less ejector holder design

II. PROBLEM IDENTIFICATION

- During needle replacement, the personnel needs to take-out the ejector assembly and use a jig to set an even height for the new ejector needle. Afterwards, the ejector holder is installed again in the machine which needs to undergo machine set-up and checking and calibration.

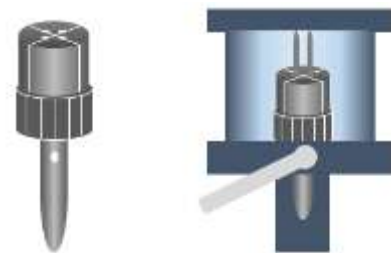


Fig. 2. Illustration of the existing design of the ejector assembly

- The procedure for needle replacement is time consuming and challenging in the part of the technician and engineer that handles the machine.
- Moreover, complex procedure is a potential cause of human induced lapses and errors.