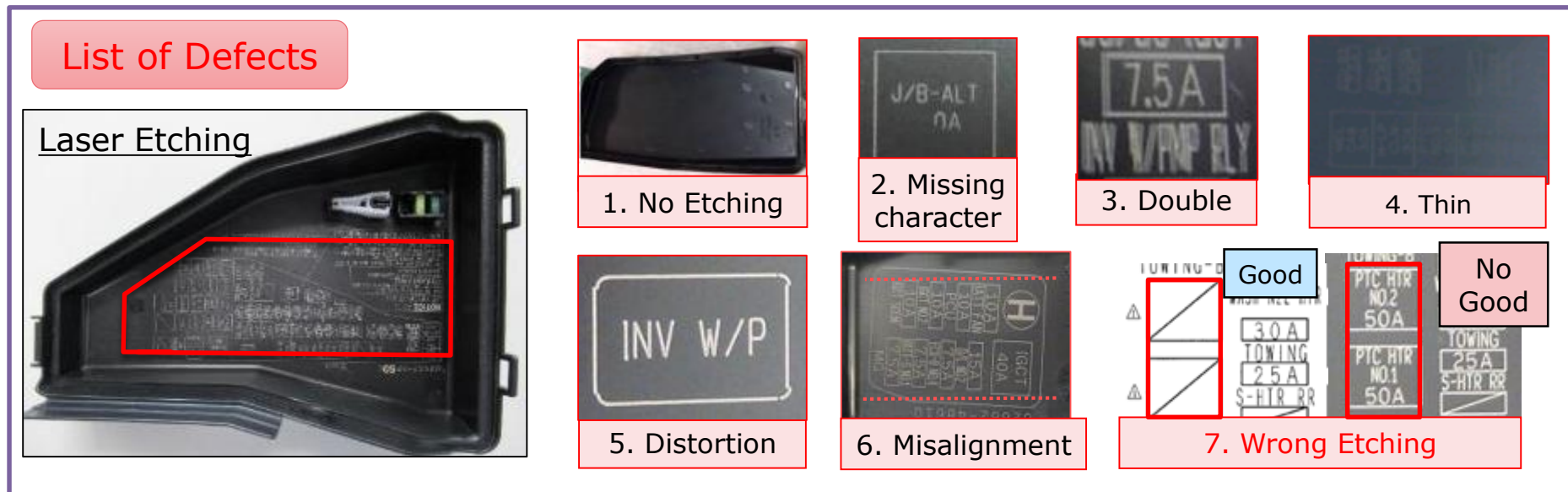


Laser Etching Past Quality History

Wire Harness Production Management Business Unit
Quality Assurance Department
Supplier Quality Department
Component Evaluation Group
3/6/2024

1. The Importance of Exercising Caution on RB Upper Cover

- RB upper covers are supplied directly to automobile manufacturers, and given that defects in these covers may impact safety regulations concerning running, turning, and stopping, there is a considerable potential for this to evolve into a substantial quality concern.
- For instance, if a 20A fuse is erroneously labeled as a 25A fuse, end users or dealers may install the incorrect fuse. In case of a circuit malfunction, the fuse may not blow, resulting in heat buildup and fire hazards, posing a critical issue.
- Hence, it is imperative to ensure a dependable process assurance in the production of RB upper covers.



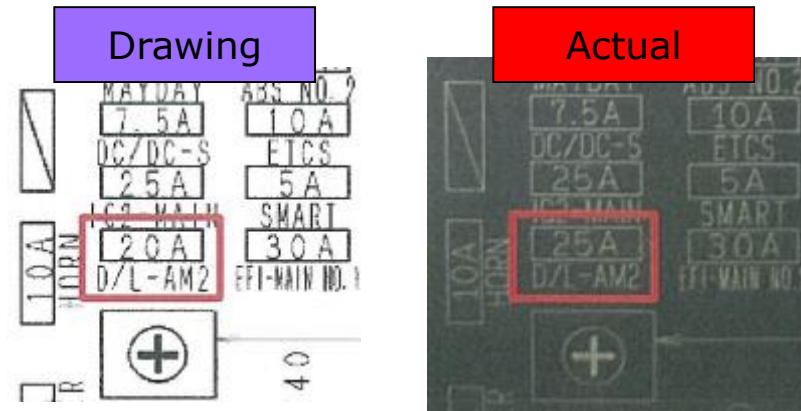
2. CASE STUDY 1

Location of occurrence : Customer

Defect : Wrong character

Defect quantity : 21 pieces

*In fact, all specific lots are out of spec.



Cause of Occurrence

During the start-of-work inspection, a misalignment in the etching position was identified. The technician responsible was working the night shift, and no supervisor was present. Consequently, when correcting the etching data, the technician inadvertently copied the data from a different part number.

Cause of the Flow-out

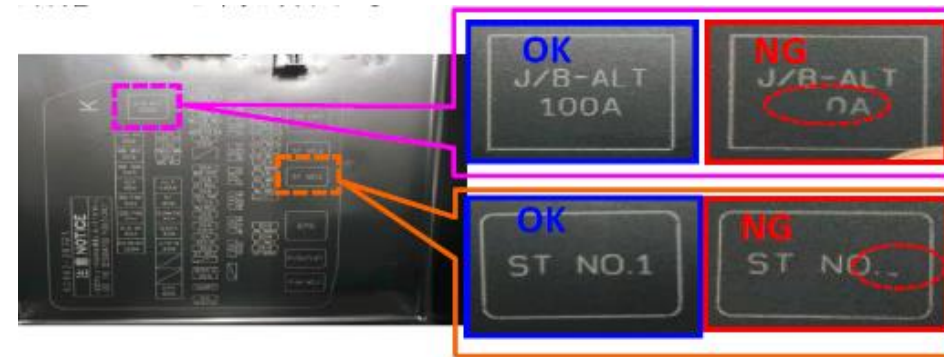
There was a lack of thorough verification of the etched contents on the actual product. At the initial end inspection, there was no procedure in place to verify the accuracy of each character on the check sheet, resulting in oversight.

2. CASE STUDY 2

Location of occurrence : Customer

Defect : Lack of character

Defect quantity : 1 piece



Cause of Occurrence

The laser diode experienced overheating caused by a malfunction in the chiller pump responsible for cooling. The machine faced frequent interruptions due to equipment malfunctions; however, because the aging equipment was sourced from overseas, the repair was not possible.

Cause of the Flow-out

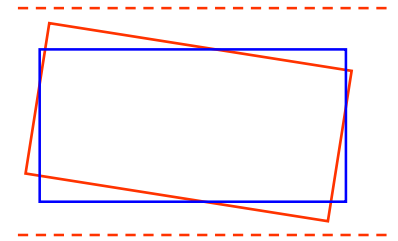
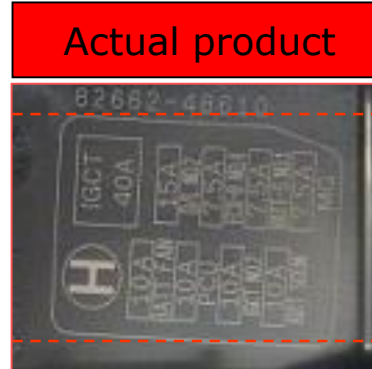
The installed camera inspection machine lacked the capability to detect a missing character measuring 1 mm. This highlights the inadequacy in verifying the accuracy of the camera inspection machine.

2. CASE STUDY 3

Location of occurrence : Customer

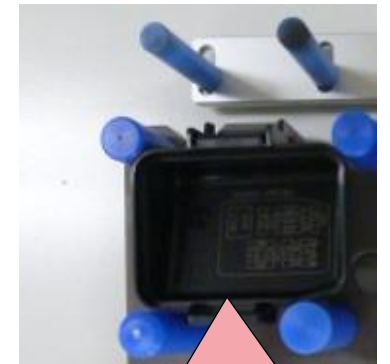
Defect : Slanted etching

Defect quantity : 1 piece



Cause of Occurrence

The jig design for securing the resin component was inadequate, allowing the component to be positioned in a floating state during etching. This lack of stability led to the etching of the component while it was in a floating state. Furthermore, there was no sensor in place to detect when the component was in a floating state.



The cover floated and set.

Cause of the Flow-out

The camera inspection machine was unable to detect slanted etching due to its limited coverage, which only inspected a portion of the etched area.

2. CASE STUDY 4

Location of occurrence : Customer

Defect : No etching

Defect quantity : 1 piece

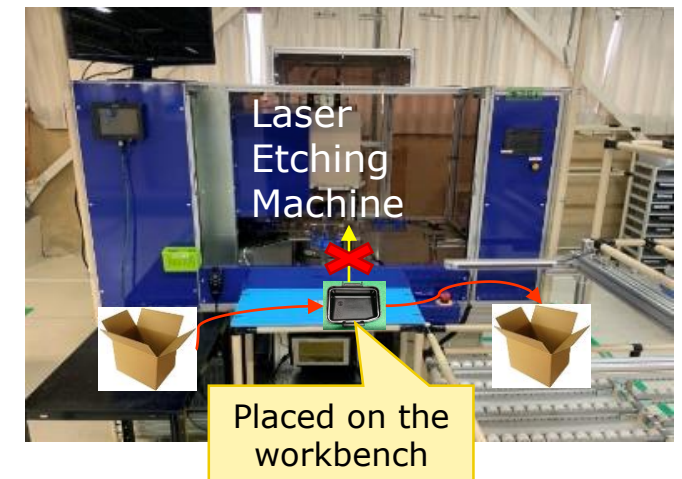


Cause of occurrence

The workload increased as a result of heightened production due to the impact of Covid. Unprocessed products that were placed on the workbench were inadvertently placed into the finished goods box, leading to skips in the etching process.

Cause of the Flow-out

Products with skipped processes were released due to an incomplete quantity match with the machine counter.

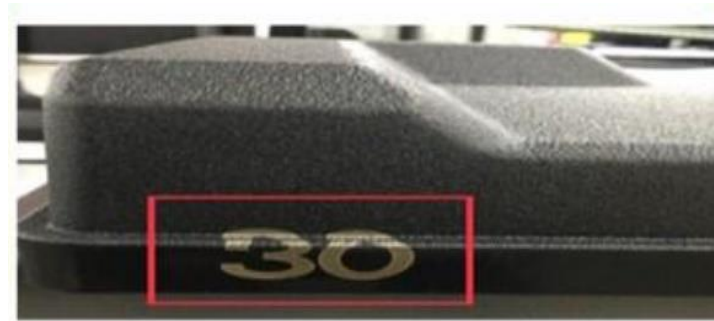


2. CASE STUDY 5

Location of occurrence : Customer

Defect : Incorrect etching position

Defect quantity : 1 piece



Cause of Occurrence

The detection sensor was misaligned, preventing it from detecting when the resin component was out of position.

Cause of the Flow-out

The defect had never occurred previously, leading to the oversight in inspection instructions that did not include checking for side etching.



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