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Kaizen Solution Preventing Mixing of Production and Reliability Parts in Semiconductor Assembly Manufacturing Setting

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Abstract*— *Herein, we present a simple improvement action to eliminate mixing of production and reliability lots by implementing color coded trays. In addition, error proofing was performed by applying a unique P-bin ID for the reliability lots resulting in the elimination of the mixing occurrences in the manufacturing floor.

Keywords*— *Kaizen, color coding, mixing, reliability, production.

I. INTRODUCTION

Mixing of units is a serious issue in a production environment often resulting in material scrappage, customer complaints, excursions and execution of non-value adding activities to recover from the issue. More serious effects include negative perception of customers, loss of trust and business, and even hampered business creation.

Kaizen, a Japanese word for 'improvement', activities are promoted in manufacturing environments to solicit simple ideas with minimal investments, that when executed have large impact on the quality, cost and service of a company.

We report herein the conception and implementation of a kaizen project targeting the elimination of mixing between production and reliability components. Implementation of simple color coding of trays, error-proofed by assigning a unique P-bin ID, completely eliminated the occurrence of mixing.

II. KAIZEN SOLUTION

Production and reliability components co-exist in the production floor, whereby the former is intended for delivery to the customers subject to the satisfaction of the quality metrics demanded by the customer, while the latter is intended to test the performance of the assembled product as a function of time and standard stresses such as temperature cycles, humidity, shock and the like. Assembled components are placed in trays as they go through the assembly process. If components are placed in the trays that appear very similar, there is a high probability where components intended for different functionalities get mixed up. This will result in misprocessing.

TABLE 1. Restraining force validations.

Restraining Forces	Method of Verification	Result of Verification	Conclusion (True Restraining Forces/ Not True Restraining Forces)	Controllability
P-bin color selection	Check if we have a conflict color requirement available in the production floor	No conflict in color selected for Reliability P-bin	Not a true restraining force	- - -
Request approval	Check if the request is comprehended on our budget forecast	Material is approved by the Manager. Comprehended in the budget forecast.	Not a true restraining force	- - -
Material availability	Check if the delivery date required can be meet by our supplier	Waiting for delivery date of the material	True restraining force	Beyond control

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TABLE 2. Identification and validation of alternative solutions.

Restraining Forces	Alternative Solutions	EP LEVEL	Validation		Measures for Effectiveness					Decision
			Method	Results	Risk	Ease	Cost	Rating	Rank	Go / No Go
Material availability	Check if Test have available P-bin not yet issued to production. Allocate the P-bin for Product 1 and Product 2 lots.	1	Communicate with concerned individuals for the request to use existing P-bin.	1	1	1	1	1	1	GO
	Continue using tray from production while waiting for the delivery date of request P-bin	1	Use the same tray from production for reliability lots.	2	2	2	1	2	2	NO-GO

TABLE 3. Potential problem analysis.

Best solution	Potential Problem	Potential Cause	Preventive Action	Containment Action	EP Level
Check if Test have available P-bin not yet issued to production. Allocate the P-bin for Product 1 and Product 2 lots.	The P-bin available is already assigned on other station of Test	Reserve P-bin for Test station	Check if the available P-bin already allocated on other station in Test. Not yet assign in Test.	Communicate with concerned individuals the proposed allocation of existing P-bin in Rel Lab.	EP 3

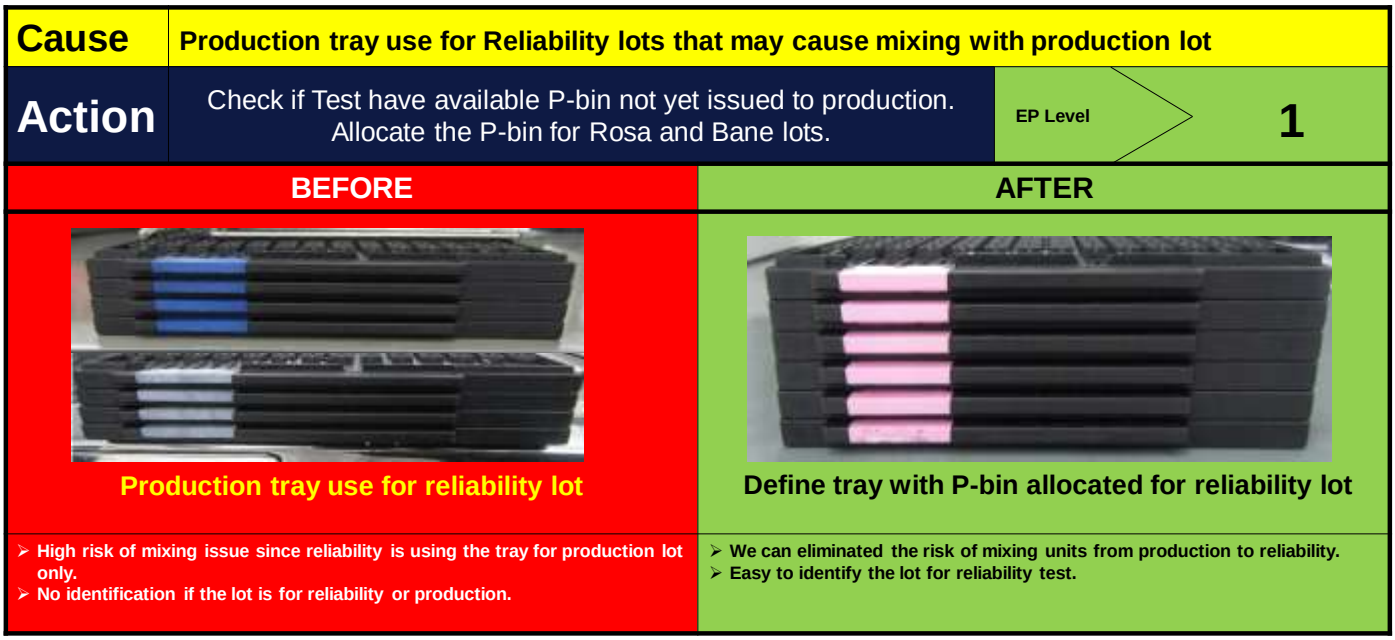

Figure 1. Comparative image of the trays before and after the solution implementation.

Activities were planned to prevent mixing issues in reliability lots when using the same colored tray used in production lots. In addition, elimination of the risk of potential mixing of units from production lots during lot preparation process was ensured by implementing unique identification for tray used in reliability lots.

Focusing on the true restraining force, material availability, alternative solutions were identified as shown in Table 2. Of the two alternative solution, solution one was selected to proceed via the identified error proofing (EP) level and measures of effectiveness. Anticipating potential problem when the solution is implemented is as important as finding

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the solution. Hence, potential problem analysis was performed as indicated in Table 3. The analysis showed that the multiple assignment of P-bin can be prevented by ensuring that allocation of P-bins is monitored and P-bins are unique identifiers. Communication to concerned individuals was identified as the containment action. Figure 1 shows the representative of the trays used before and after the implementation of the solution resulting in the established traceability for reliability lots inside the production floor.

III. CONCLUSION

Implementation of the Kaizen solution completely eliminated the risked of mixing of production and reliability lots. Simple solutions such as color coding and unique P-bin ID assignment resulted in complete traceability for the reliability lots inside the production floor. These results highlight that simple solutions with minimal investment can drive improvement and prevent any quality issues.