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Introduction

Automotive sector is one of the most competitive around the world. Every time all companies in this sector improve competitiveness with focusing this improvement and manage its quality. Magneti Marelli (MM) is one of this automotive worldwide group. It makes embedded electronics for car and need to improve quality all the time. I take part of this with this internship because I have fitted in quality services.

The MM Group is divided in multiple affiliate like MM France and MM Slovakia. I work in the first one but I made my internship in Kechnec's Plant in the south of Kosice, Slovakia. My main mission is a quality project in Slovakian plant with the methodology of this country. The second one is a comparison of WCM approach between this two plants.

The context

Magneti Marelli : A worldwide Group

Magneti Marelli is a Italian worldwide automotive group. It was a joint-venture between FIAT and Ercole Marelli in 1919. The group have plants in 19 country and about 43,000 employees around the world. His activities is divide in 8 great family of products and services.



Magneti Marelli Slovakia

The beginning is in 2007 when Magneti Marelli decide to launch the production in Kechnec. This plant takes a part in the electronics system division. Today this plants produces three families of product : cluster, body and infotainment (radio, GPS…).

Quality service

Like every automotive company, you have a Quality service. The goals of this service are eliminate defect in the plant, avoid 0km or warranty claim and answer to the customer requests. This kind of service is a warranty for the customers. I work in the process part of this service.

Mechanical shop team

This part is Mechanical shop. They produce body and infotainment products. I work in this team on components defects.

The description of my project

F3A - What is that ?

F3A is an abbreviation which means : Fast Analysis and Adequate Action. It's a methodology implemented in Chatellerault and Kechnec by Jean Michel Meot. This method come from Valeo Group and permit to solve defects in a maximum of 20 days. It is also an assembly of multiple tools like 5 why, 5W2H, Flowchart… We won't describe each tools in this report, but they are standards in automotive fields. I propose to begin the description of each PDCA step of this project. The goal of this one is to solve crashed and arrached component on the line.

Containment – The beginning of all F3A

It's the first part of F3A, I created the follow-up , initiate analysis actions plan and pareto law to define priorities. In case of customer claim, we add 5W2H and containment action. We don't have reclamation on this project.

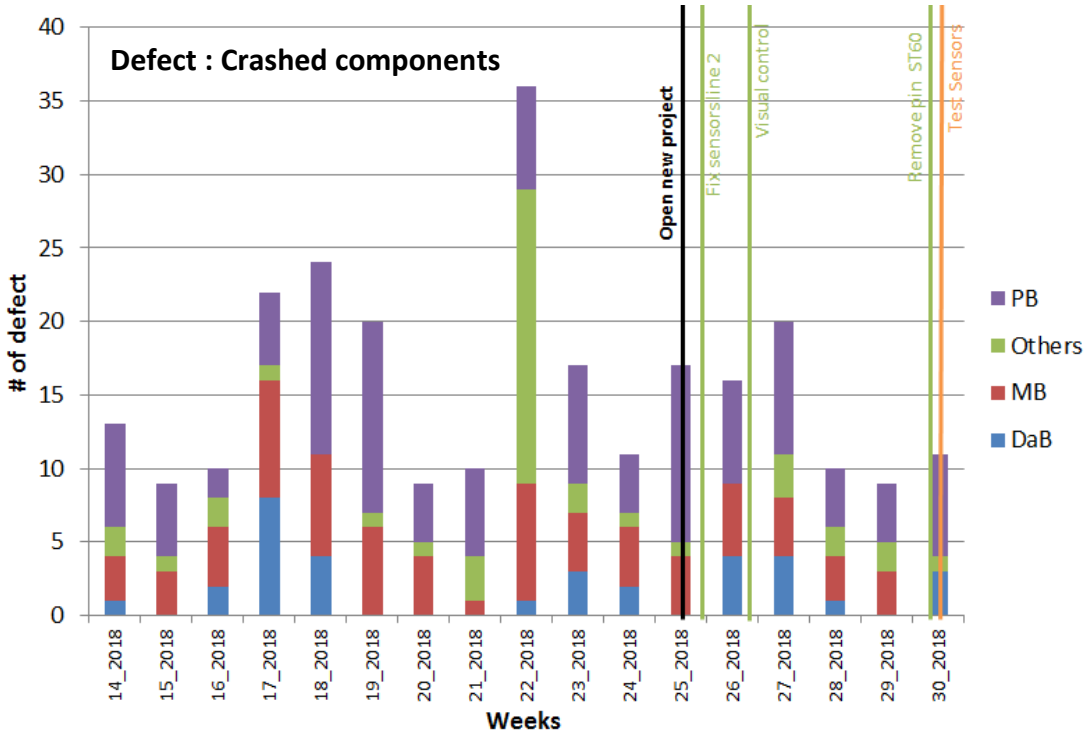


Figure 1 - Follow up

Plan – Descriptions of the defect and the process / causes analysis

It's the second time of all the project, I work 2 weeks on it. I study the process to understand the principle of the product (BMW Evo) and each step of the process. After, I make description of defect and flowchart of production process with the Quality Engineer.

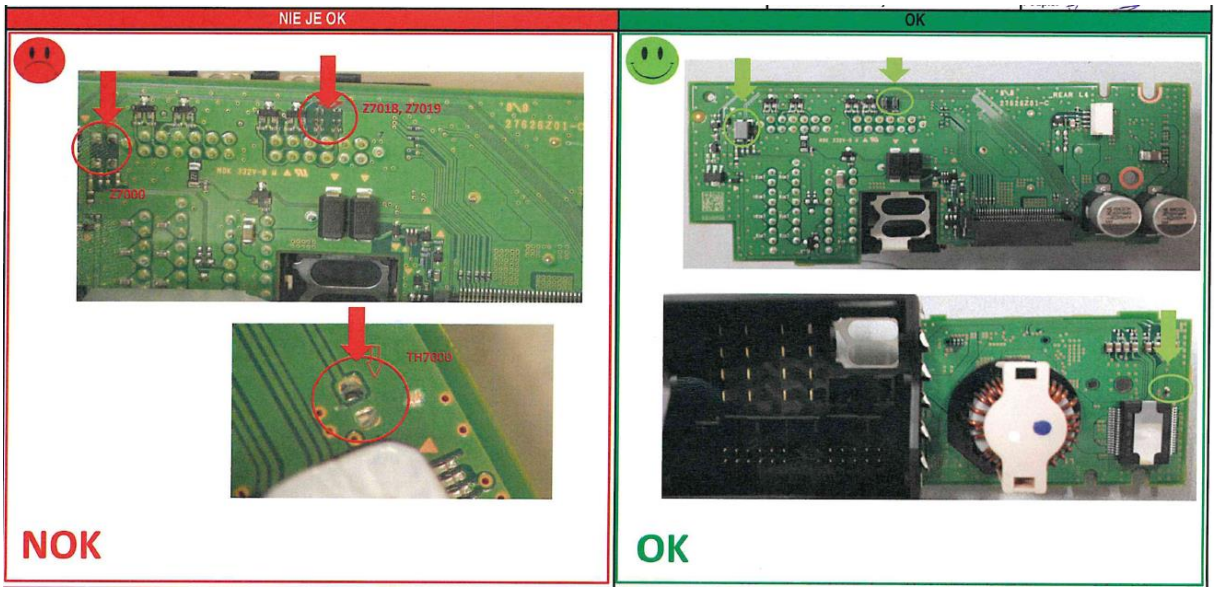


Figure 2 - Defect description

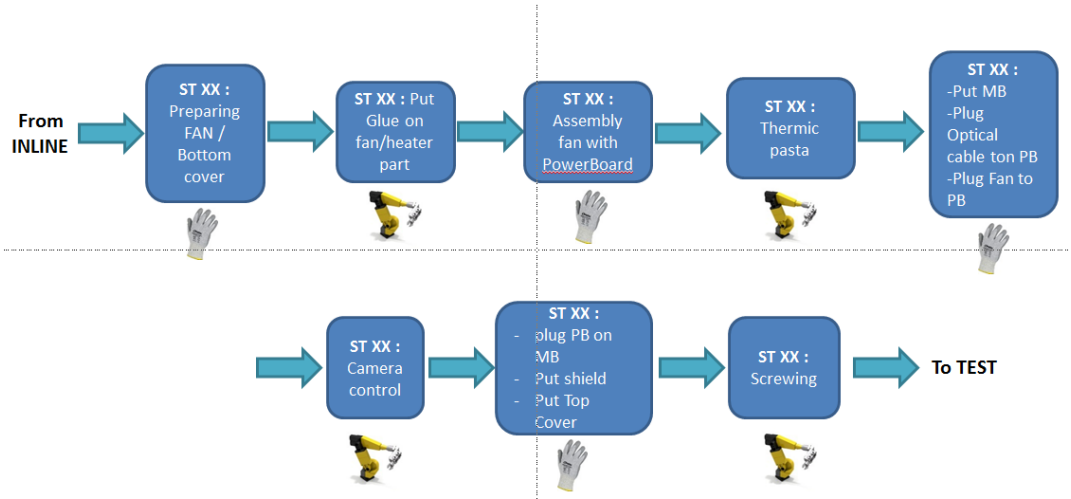


Figure 3 - Part of flowchart

It's also the part of project, we create the follow-up of the defects and do some analysis.

After that, I open 2 Ishikawa's diagrams to begin causes analysis. To initiate this part of the work, I list on this sheets all ideas and potentials causes of the creation (Occurrence) or no-detection of the defect. Each idea or potential cause has linked to an analysis action to confirm or not this one. (Each number on the following 4M1D are linked actions).

The first analysis action put in place, is a visual control that permit to verify the conformity of part before assembly.

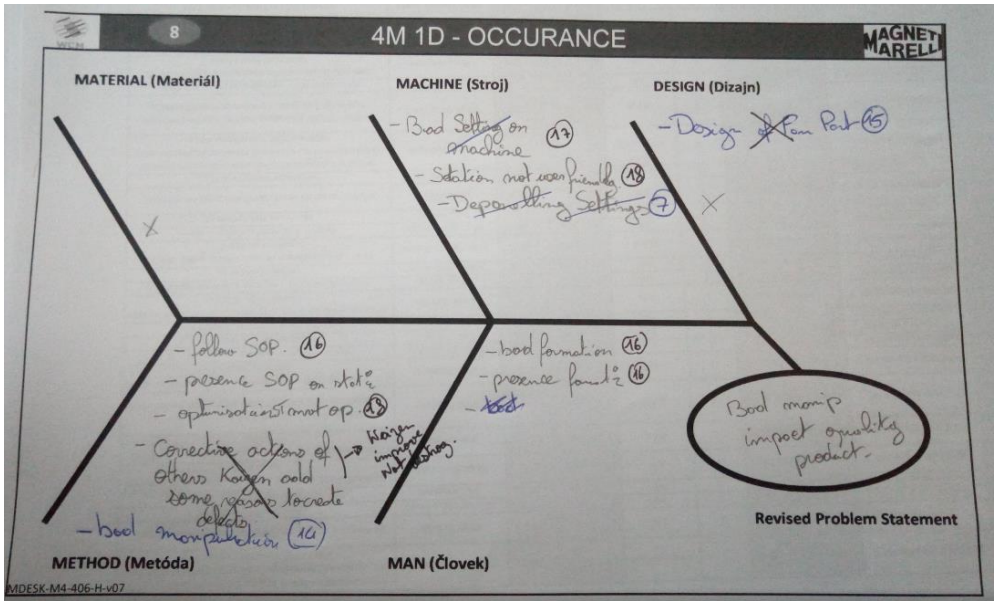
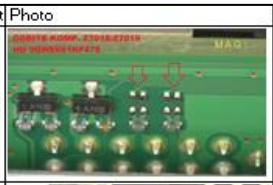


Figure 4 - Ishikawa - Occurrence

After I make analysis of defect and create a shopping list with picture, line, number, and notes. This kind of document helps to follow of each defect and to check the traceability of each pieces (to verify the presence of abnormal manipulation.

Nb	Part	Photo	Defects type	Test	Line	Components			Notes
0GWE661KF478	PB		Arrached	AFT	1	Z7018	Z7019	-	- suspicion on depaneler => Visual Control in place 0 defect for the moment - Shock btn PCBs in SMT Line
0GWB663WM678	PB		Arrached	AFT	2	Z7000	-	-	
0GW6660LA278	MB		Chocked	AFT	1	L4002	-	-	~~- Shock btn PCBs in SMT Line~~ ; => ST 60 ASSY LINE / Defect buffer / T. Schlosser reproduce defect => Improvement of station.
									

After analysis, my colleague and me have found 2 root causes of 2 components defects. I plan the palliatives and correctives actions.

Do – Implement Actions

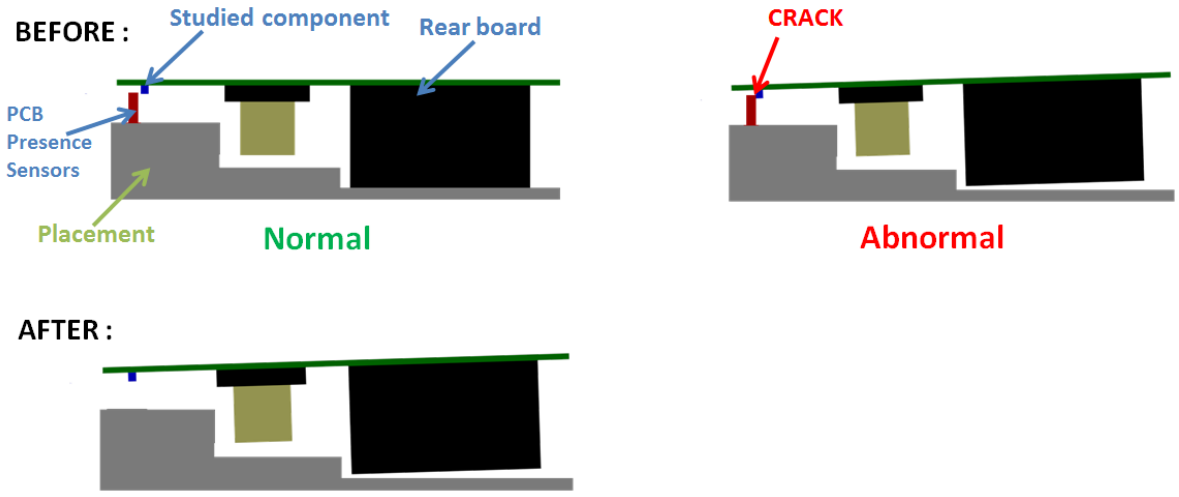
In this step, my team and me implement palliatives and correctives actions following the action plan create in Plan step. At this moment, we have two actions, one palliative and others are correctives.

Nb	Defect Description	Actions	Due	In Place
Palliatives actions				
1	Sensors touch component	Modify height of sensors	07/01/2018	06/22/2018
Correctives actions				
2	Bad Manipulation on fixture	Removing fixture on Station 60	07/25/2018	07/25/2018
3	Sensors touch component	Removing Sensors	01/08/2018	25/07/2018

All actions put in place, we begin the check part of the project.

Action 3 : Removing sensors

My colleague find a difference between the two lines . It was the height of the sensors on station 30. We asked a repair to Maintenance service. It has fixed That reduce the number of defect. We decided to remove completely this sensors. This action eradiquate the head of pareto defect.

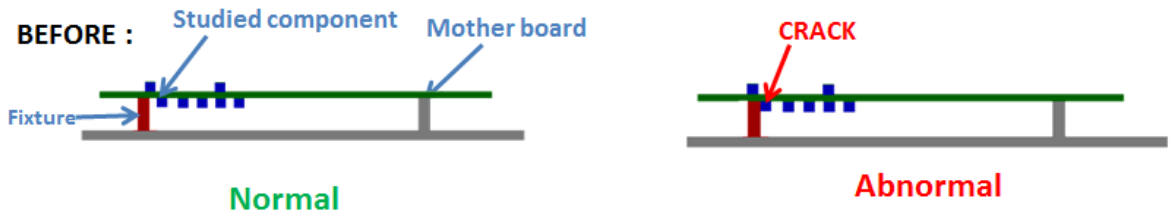


Results : 0 defects after this action

This action have no effect on customer quality or control plan. I decided to implement it as an corrective action.

Action 2 : Removing fixture on Station

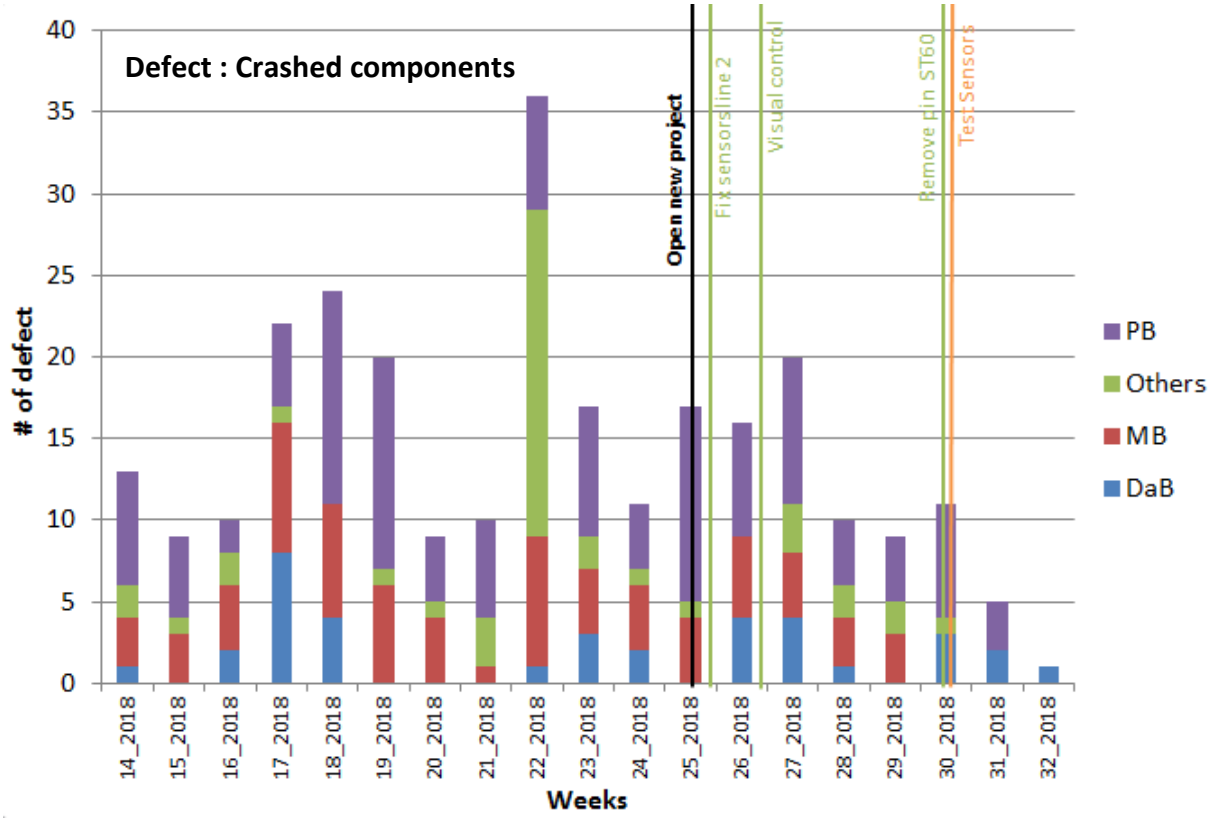
After reproducing the defect on station 60, by manipulation of parts inside this station. The problem comes from the fixture. This one can touch & crack components when a bad manipulation happened. We decided to remove this fixture to avoid defect creation in the future.



Results : 0 defects after this action

Check – Verify the efficiency of actions

It's the step of checking the efficiency and validate or not if actions are correctives. That's why we make a new follow-up to compare the level of defect (per cent or numbers) before and after each actions.



The second part is here to verify if actions stay in place in the time. For check that we use 5 questions for zero defects. This tools is a list of 5 questions. Each questions have 3 possibilities. Each answer give between 1 and 5 points. The goal is to improve the first score and have a ratio sum of points by minimum score of 80%.

	MACHINE	ANSWER 1	3	5	Before	After	Note
1	Are the settings for zero defects clear?	The settings are defined but the current condition is not known	Settings defined and a method to check is available	Defined and easy to see and check without special access or tools.	1	5	
2	Are the settings easy to set?	Difficult to set.	Easy to set	Set automatically	3	5	
3	Does the output vary outside of the range?	Output varies during operation	Output only varies due to set up of the machine	Variation only by exception	1	5	
4	Is variation of the actual condition visible?	Low probability of knowing variation is occurring.	The periodic inspection system is able to detect the variation.	Continuous monitoring of the input parameters with alert before defects are made so correction can occur without scrap.	1	3	
5	Is it easy to get back to the setting for zero defects?	Requires technical support to adjust machine settings	Restored by qualified operators that can adjust machine settings	Automatic adjustment (closed loop)	1	5	
				Total	7	23	
				%	28%	92%	

Page 1

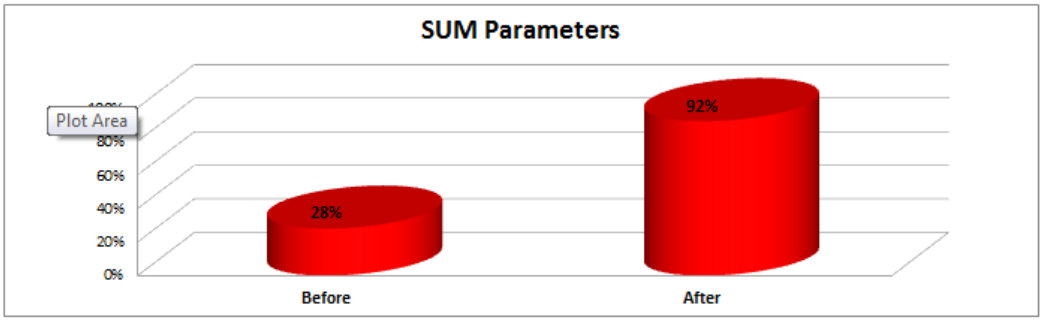


Figure 5 - Exemple de 5QZD

Act - Standardization

I just began this part but I don't finish this one. The goal of this step is the capitalization of improvement and store that in new standards like : Maintenance Prevention Information (MP–Info). For this project, I began to write two MP-Info because we changed machine parameters (removing sensors or fixtures). This document contains 2 sketches (before and after) and the description of the action. It is created to avoid this kind of issue on future lines.

Difficulties and Actions

Languages barriers

In a professional mission, the communication is the key to manage and solve all problems. It's a necessity to have a mastery in English to ask question with collaborator and manage project. At the beginning of my internship, I had some troubles to speak English. I blocked my mind for every mistake. After 3 weeks, I began to loose my habits of French language and my brain switched to English. And communications began easier between me and my colleagues. When I lose a word, I tried to explain the meaning.

But, there are another problem. This one is linked to operators. Only one production employee per team speak English so I have many trouble to explain my presence on the line and my mission. To avoid any problem, I went on the line with one colleague who speak English.

Learning new process without knowledge about product

I arrived in the slovak Magneti Marelli plant without known process used here. The global meaning is the same as Chatellerault, because this two plant follow a WCM Methodology. But the difference is in application and detail. So I learn the process in two weeks of observations.

Conclusion

On 3 components, we have fixed 2 issues by actions and begun the analysis for the third one. My colleague finish this project alone. Work in an automotive company, outside France, is a good experience to learn another point of view about work methodology. Between Chatellerault and Kechnec, methods and tools are not really different because this 2 plants follow the World Class Manufacturing meaning.

For me, this trip is good to acquire an international work experiences and knowledges. Because you meet many foreign people, learn other culture and share the French culture. I learn also many new professional knowledges and about me.