



Dissertation – Reactive Quality Improvements Break Glass Procedure



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Executive summary

The main topic for this dissertation was to analyse customer concern to understand why there was an increase from 2016 a year which MLUK achieved a 0 PPM score to 2023 where the PPM score was considerably higher. From the conclusion of the analysis a new procedure was created by myself based on the 8D format to ensure containment was done correctly when a concern is found internally or externally at customer. The reason for need of this procedure was due to a MLUK redundancy program known as Sky Line where support function now had to prioritise their work more carefully and shop floor containment was something which couldn't be supported 100% as previously done. At the same time there was also a new level of manufacturing supervision introduced.

This new procedure is known as break Glass is designed to be a fully interactive procedure which manufacturing can use to ensure a structured approach to containment is followed ensuring the end customer is safe. The procedure also captures all the relative information which can be provided to management at any point showing the level of control which is being undertaken.

This procedure was also accompanied by a training programme to ensure that all of manufacture was trained and more importantly understood the new break glass procedure.

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Introduction

Quality in the automotive world can either make or break a car manufacturer, considering in 2022 a staggering 85.4million motor vehicles were made which is an increase of 5.7% from 2021. With numbers like these you can see why car manufacturers want reliable cars with good build quality. (<https://www.acea.auto/figure/world-motor-vehicle-production/>, 2023)

When also looking at statistical data from 2022 the top ten car manufacturers for recalls show some frightening results.

1. Ford: 67 recalls, 8,636,265 units
2. Volkswagen Group: 45 recalls, 1,040,885 units
3. Fiat-Chrysler/Stellantis: 38 recalls, 3,041,431 units
4. Mercedes-Benz: 33 recalls, 969,993 units
5. General Motors: 32 recalls, 3,371,302 units
6. Kia: 24 recalls, 1,458,962 units
7. Hyundai: 22 recalls, 1,452,101 units
8. Tesla: 20 recalls, 3,769,581 units
9. BMW: 19 recalls, 1,000,455 units
10. Nissan: 15 recalls, 1,568,385 units

(Gorzelany, 2022)

When you put these figures against the number of cars each manufacturer produced that year the graph produces an interesting comparison, with two out of the manufacture recalling cars multiple times resulting in more recalls than cars made.

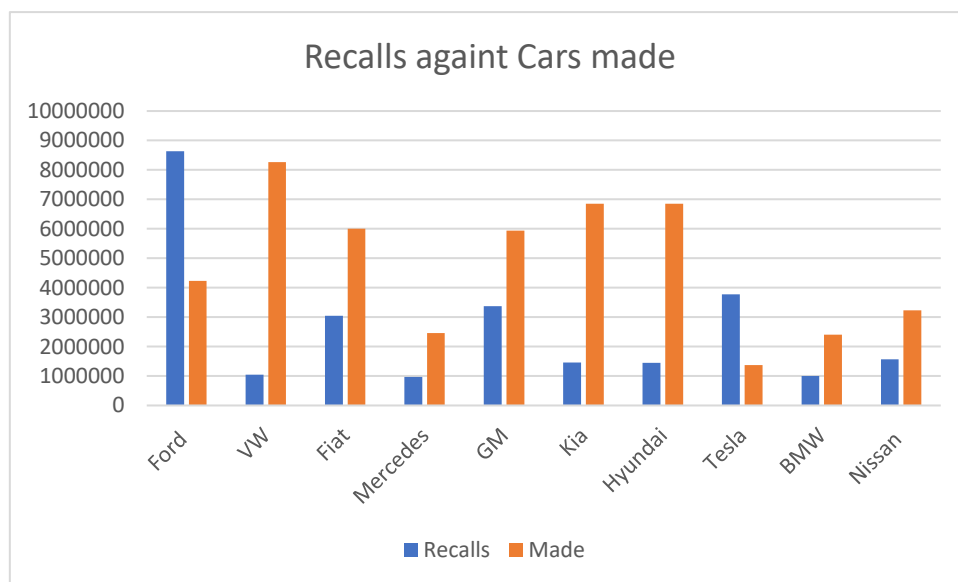


Figure 1 - Recall against Cars Made

The sum of these top 10 car brands for recalls was 26,309,330 which is 30.8% against the total number of cars made that year. Although some of these recalls maybe small and something the end customer would never notice, some of these could be life threatening for the end user which could damage the reputation of the car manufacturer and landing them with large fines, recall charges and even lawsuits.

One of the biggest recalls in the automotive industry is the Takata air bag system, which is used in Honda car, This issue being was a design fault with the airbag system and when the airbag was deployed in an accident shards of metal would fly out into the vehicles cockpit, seriously injuring and potentially killing a person. This problem affected 30 million cars within the top ten car produces and lead to Honda being fined \$70 million resulting in the Takata second tier to file for bankruptcy.

(Grigelevičius, 2022)

Although not all recalls threaten lives one of the costliest recalls to date happened in 2016 and cost the company behind it \$40 billion in fines, court fees and customer settlements. This was the scandal known as “Dieselgate” and made history for the largest recall in European history. This was down to Volkswagen knowingly fitting devices to their cars to produce emissions at a particular level during MOT’s where under normal conditions the cars were non-compliant to the emissions regulations.

(Wehrmann, 2020)

So understandably quality in the automotive industry is taken very seriously and although this dissertation isn’t going to be focusing on recalls it is however going to be focusing on quality within a Tier one manufacturing facility looking at customer concerns which potentially could become premature field failures resulting in a recall happening.

Company background

Marelli is currently the 9th largest independent automotive supplier in the world , the factory shown in (Figure 2 - Marelli birds eye view) below is of the South Wales facility which is part of the thermo solution division. This site was previously known as Calsonic Kansei but as part of a merger in 2019 with Magnetic Marelli it became Marelli. The Llanelli plant is Know as Marelli Llanelli UK or abbreviated to MLUK.



Figure 2 - Marelli birds eye view

The product base has stayed the same since this merge with MLUK specialising in automotive heat transfer ,producing engine cooling systems (radiators) and air conditioning components (condensers). These are supplied to a range of customers which include Jaguar & Land Rover, VAG, Nissan and Stellantis Figure 3 - customer profile.



Figure 3 - customer profile.

All the heat exchanges which MLUK manufacture use the same process where a tube and fin are used to create the matrix of the heat exchanger, shown in Figure 4 - Heat .

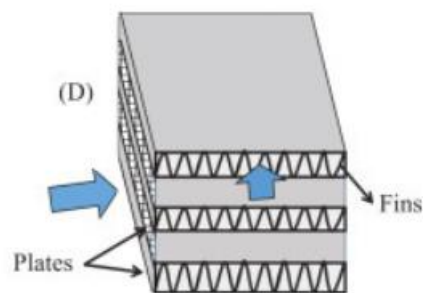


Figure 4 - Heat exchanger.

These tube and airways are made from aluminium and are very delicate one by the natural state of aluminium but also because the material is very thin, with the airway being 0.07mm in thickness.

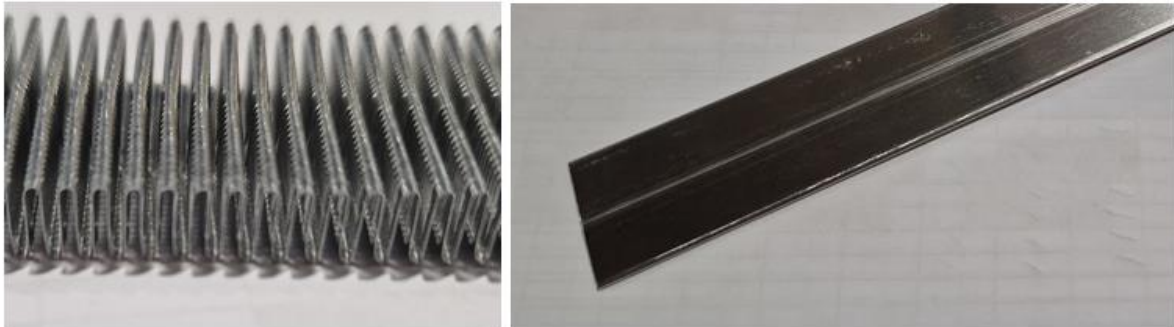


Figure 5 - Example of airway and Tube

Examples of the products which MLUK make are shown in below in Figure 6 - MLUK Product. The top left is one of the largest radiators MLUK makes which fits into the Range Rover and the middle picture top left is the largest condenser which is also fitted into the Range Rover .



Figure 6 - MLUK Product

Aims and objectives.

- Within this dissertation the main aims and objectives are to look at what current quality controls which are within Marelli's MLUK (Marelli Llanelli United Kingdom) manufacturing facility. Looking at the effectiveness of the quality control both preventative and reactive, by analysing customer concerns and internal scrap caused by quality concerns. I turn it will give a clear understanding on where to focus in order, to make improvements to quality within MLUK. Resulting in reducing the number of customer quality concerns and reducing the amount of internal quality concerns which generates internal scrap.
- Achieving a positive result in both will firstly provide cost saving to MLUK by preventing any quality defective parts being scrapped off, but there is also the cost saving of not having to remake the parts again which eliminates the need for employee overtime at a higher rate of pay. In relation to quality control can contribute to customer concerns a cost saving every time the customer has a concern there is a duty to ensure that all stock on their site is checked and safe to use To do this an external sorting company are used which can cost up to £10,000 per activity.
- Having a customer quality concern also effects MLUK's reputation. No customer wants to be receiving quality defective parts which could disrupt their output or worse tarnish their own reputation by their end customer not wanting to purchase their car brand.

Literature review

Purpose

To gain a better understanding of the topics which I am going to be looking at a literature review has been done allowing me to look at current quality tool, techniques and methods which have been established and currently being utilised across the automotive industry. Which includes looking at tool, techniques and methods which have evolved from the originals and are currently being adopted by the large OEM customers.

To be able to do this I will using.

- Web site
- Books
- Past research papers on similar subjects
- Lecture material.
- OEM information
- MLUK information

These will include both Qualitative and Quantitative information.

“Understanding the difference between qualitative vs quantitative data means understanding that qualitative variables are descriptive while quantitative variables are measured and given a numeric value. An example of qualitative data is color, while an example of quantitative data is height in inches.” (Harvey, 2023)

Poka Yoke

Before knowing where to look for a poka yoke or which type of poka yoke it is, you firstly need to know what a Poka Yoke is. Then you can categorise it into one of two types, preventative and detection.

A poka-yoke is a mechanism that is put in place to prevent human error. The purpose of a poka-yoke is to inhibit, correct or highlight an error as it occurs. Poka-yoke roughly means "avoid unexpected surprises" or "avoid blunders" in Japanese. In English, a poka-yoke is sometimes referred to as "mistake-proof" or "foolproof." (Daniel, 2023)

A simple way of explaining what a poka yoke is through an example shown in Figure 7 -Poka Yoke example. This is a plug which can only enter one of the sockets no matter what method you use the plug will only fit into the second socket making it error proof or poka yoked. Knowing what a poka yoke is they can now be categorised.

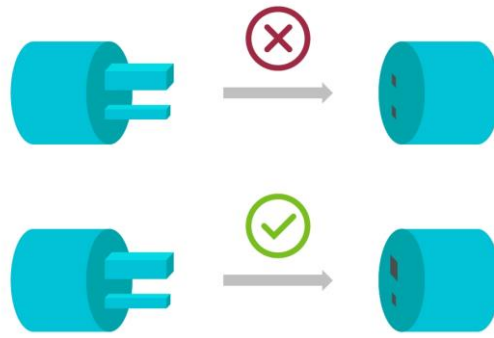


Figure 7 -Poka Yoke example

Prevention poka yoke

Techniques are designed to prevent errors from occurring in the first place. Examples include designing products or processes to be error-proof, simplifying tasks to reduce the risk of errors, and providing clear instructions or visual cues to guide workers. (Edstellar, 2022) An example of this is shown in Figure 7 -Poka Yoke example where the plug and socket is designed to only fit together the correct way.

Detection poka yoke

Techniques are designed to detect errors as soon as possible, so that corrective action can be taken before defects or harm occur. Examples include using sensors or other devices to detect errors in machinery or equipment, implementing quality control checks to verify that products meet specifications, and using statistical process control to monitor and analyse process data. (Edstellar, 2022) An example of this can be found in the form of a camera vision system which will take an image of an assembled product and if it doesn't match the preprogrammed image it will fail.

8D problem solving.

An 8D is a type of problem-solving methodology which guides the user to through 8 disciplines when completed correctly the root cause to the problem should be established and the correct permanent countermeasure put in place.

1. Select an appropriate team.
2. Formulate the problem definition.
3. Activate interim containment.
4. Find the root cause.
5. Select and verify corrections.
6. Implement and validate corrective actions.
7. Take preventive step.
8. Congratulate the team.

(Benbow, 2017)

Key areas when looking working on an 8D is that it is not a solo problem-solving tool and requires input from a team with a broad range of abilities and skill sets.

Containment action

When implementing interim containment actions, you firstly need to identify the extent of the problem and try to limit it, the key is to apply prompt action in the right area. In quality the first response should be to protect the customer and the interim containment action is the “first aid “ which protects the customer from the problem until the true root cause can be established and a permanent corrective action implemented.

(Promigra d.o.o., 2016)

D3 Implement and verify interim containment actions

- Temporary fixes. Define and implement those Intermediate actions that will protect any Customer from the problem until permanent corrective action is implemented
- Material / Product locations; Raw Material, Semi-finished Goods (WIP), Finished Goods, At Customer, At Supplier, In transit (from Supplier or to Customer), Shipping and/or Receiving Dock, Materials on order (future shipments from Supplier)
- Verify the effectiveness of the containment actions with data

(AIE (UK) Ltd, 2020)

Problem solving tools.

To help establish the root cause of a problem there are a number of problem-solving tools which can be used.

Ishikawa diagram

The founder of the Ishikawa diagram was Kaoru Ishikawa who was born in 1915, he went on to study engineering in applied chemistry in the University of Tokyo. From there he was associated with Nissan until 1947 after which he started rendering his service as a professor in a university, passing away at the age of 74 in 1989, He was known as the Farther of Japanese Quality (OpEx Learning Team, 2019)

The Ishikawa diagram is known by several different names.

- Fishbone diagram
- Herringbone diagram
- Cause and effect diagram
- Fishikawa

These are a causal diagram which show the causes of a specific event, which resembles a fish skeleton. The head of the skeleton is where the final problem outcome is placed and the bones of the skeleton represent the cause of the event, with each bone branching off to give categories under the main sub heading. The purpose of this type of diagram is to allow the user to manage which

categories are the mostly likely to cause the problem and place them in priority to investigate. Example of a Ishikawa diagram is shown below.

(Hayes, 2023)

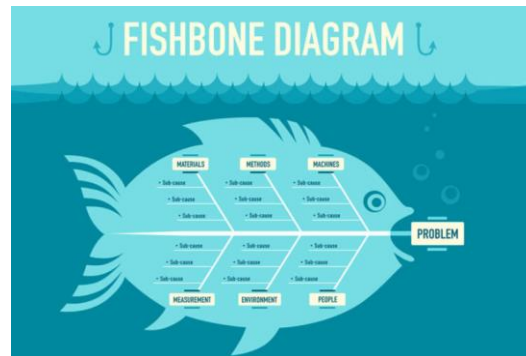


Figure 8 - Ishikawa diagram

Five Whys

The creator of the five whys shown in Figure 9 - Five Whys methodology was Sakichi Toyoda who was a Japanese industrialist, inventor, and founder of Toyota industries. He developed the Five whys techniques during the 1930's however it was not widely used in the car manufacturing industry until the 1970's but is still a popular tool used in Toyota and other car manufacturers today.

The method which Sakichi Toyoda developed is remarkably simple: when you are faced with a problem you try an establish the root cause by asking "why?" and you should come to the root cause generally within five asks of why, hence Five Whys.

However, this technique may not be suitable if you have a complex or critical problem, this is because the five whys technique will tend to lead you down a single track to pursue or a limited number of investigation tracks, when there could be multiple causes to the issues that could be potentially missed, resulting in the true root cause not being established and closed out.

(By the Mind Tools Content Team, 2024)

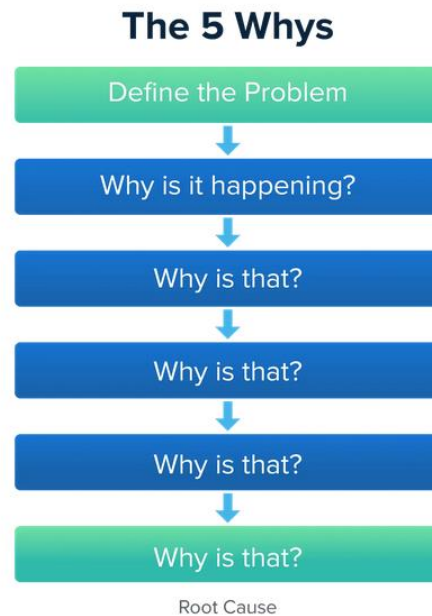


Figure 9 - Five Whys

Data gathering

Data gathering is one of the most important steps during the research process as it will give you information about a specific subject which can be analysed, and an informed decision made based on the data gathered.

This data can be analysed in several different ways but two of the most common ones used when looking at numerical data are, Pereto Charts and Scatter Diagrams.

Pareto Chart

A Pareto Chart displays the information in a series of bars in which the height of each bar reflects the frequency the problem has occurred. This can be arranged in ascending or descending order shown in Figure 10 - Pareto Chart, which clearly demonstrates that the Product has the highest number of customer complaints.

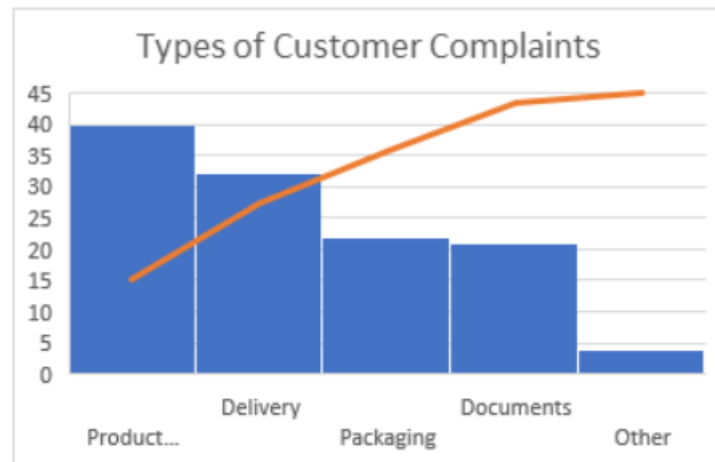


Figure 10 - Pareto Chart

Scatter Diagram

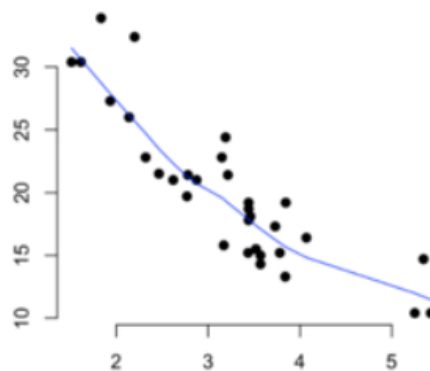


Figure 11 - Scatter Diagram

A scatter diagram shown in Figure 11 - Scatter Diagram can also be referred to as a Scatter plot. It is a graph where two variables are plotted along the two axes, this can be the suspected cause is plotted on the x-axis and the effect is plotted on the y-axis. If there is a clear pattern or trend between the variables more sophisticated correlation analysis can be conducted.

(complianceonline, 2024)

Appearance standards

Agreed by MLUK and the customer at the start of any project is a set of appearance standards (Figure 12 - MLUK appearance) which MLUK must manufacture the product too. These are realistic and achievable targets as it is impossible to manufacture in a perfect condition with tolerances being applied to the appearance standards agreed.

	<u>Appearance Quality Standard</u> <u>Radiators</u>		Issue	7
			Date	08/04/17
			Page 1 of 11	
Item	Photograph/Sketch	Quality Standard	Remarks	

Marelli

APPEARANCE QUALITY STANDARD

RADIATORS

Figure 12 - MLUK appearance standards.

Even though MLUK manufacturer parts for a number of different customers the appearance standards have been set up for the tightest standards, All products are manufactured to the same tolerances and appearance standards, to eliminate human error when manufacturing products for different customers

Standard operation sheets (SOS)

A standard operating sheet or abbreviated to SOS is a step by step document which outlines all elements of a specific operation, this is done in an illustration and written format. This document will also give the approximate amount of time a task should take and also tell you if any additional personal protective equipment is required when undertaken a specific operation.

(McGovern, 2018)

A company that demonstrates this very well is Lego. Every set you purchase from them will contain a SOS on how to build the product. As shown in Figure 13- Lego SOS.

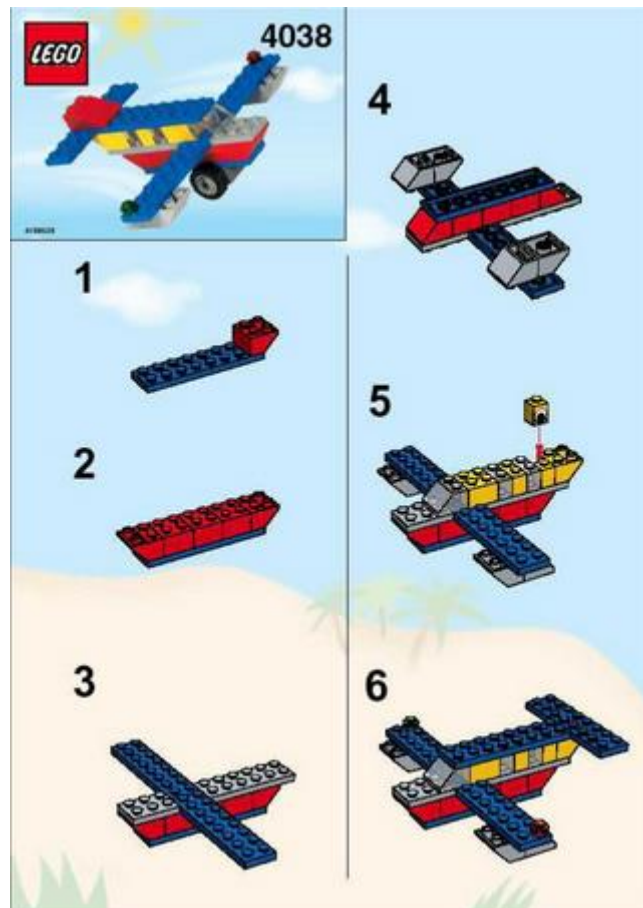


Figure 13- Lego SOS

Stop, Call and Wait

MLUK uses a process called Stop, Call and Wait when an abnormality is found. There is a comprehensive list of examples which the employee can refer to and also detailed instructions what to do when following this procedure. Figure 14 - Stop, Call and wait page 1

Summarising the process, If a MLUK employee (not only operators but for any employee working at MLUK) finds an abnormality, this can be with a component part, The assembly machine itself or even part shortage they must immediately Stop the process, Call Supervision and Wait for the abnormality to be corrected prior to continuing.

This information is shown in Figure 14 - Stop, Call and wait page 1 and Figure 15 - Stop, call and wait page 2

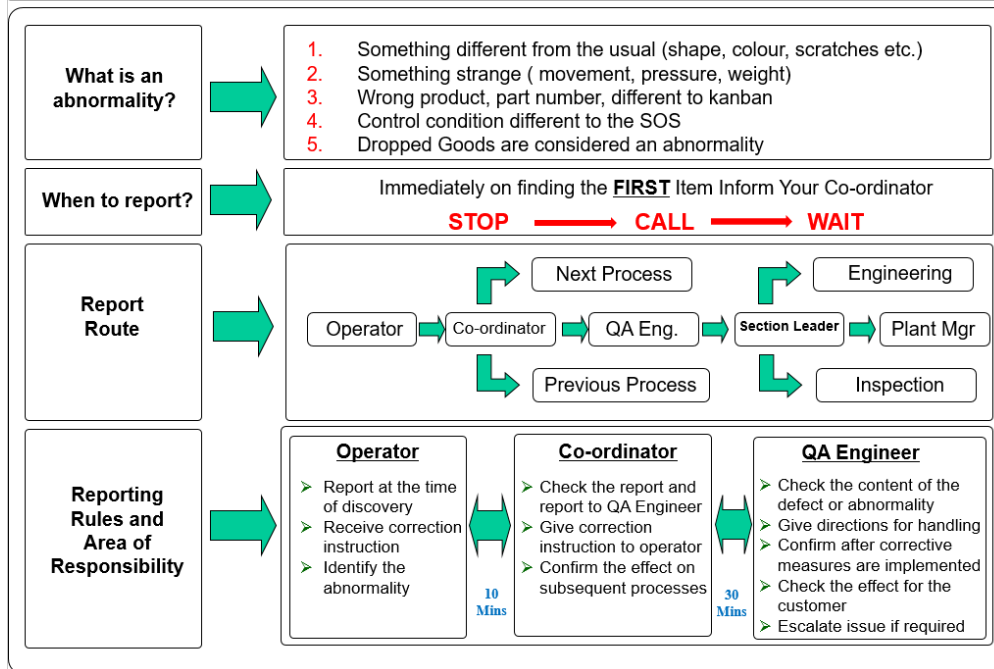


Figure 14 - Stop, Call and wait page 1

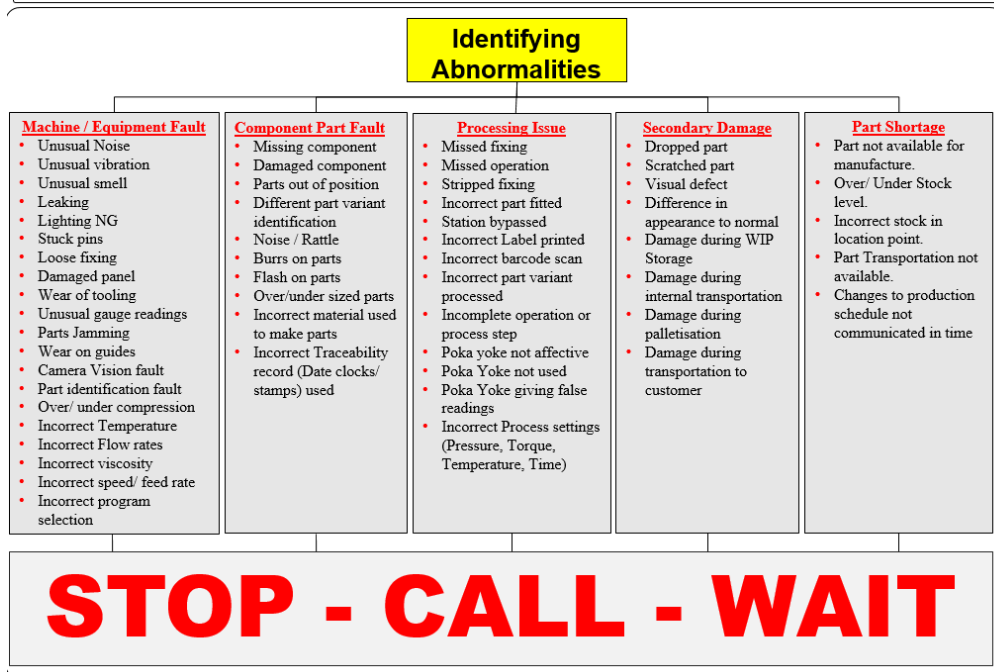


Figure 15 - Stop, call and wait page 2

4M

4M's is a method of working which refers the beginning "M" of each of the categories which are considered as part of the change. Man, Method, Machine, Material. If a change happens which involves any of these, it must be recorded on the 4M document within the business as a record of the change. The 4M document will also highlight area's which need to be considered when these changes are made, for example if a new person is placed on a job is additional training required to perform the job? Or if a method is changed what other documentation needs to be changed to incorporate the method change.

(Qmsdoc, 2023)

4M Checklist

MATERIAL		METHOD	
Production volume is as expected	☐	Are the processes adequate	☐
Inventory levels are correct	☐	Is safety considered in the process	☐
The brand name is being considered	☐	The quality of the product is ensured	☐
The storage is adequate	☐	Efficiency compliant with standards	☐
MACHINE		MAN	
Was the inspection executed	☐	Follows the standards	☐
Are the hazardous components tagged out	☐	Was trained for the task	☐
Is the lubrication as planned	☐	Aware of its environment	☐
The order of the process is well programmed	☐	Efficiency compliant with standards	☐

Figure 16 - 4M check list

Interview with customer.

To understand how a large operation manages supplier quality concerns I contacted Jaguar Land Rover which has over 900 suppliers providing them with various complex parts in order to build one product the new Range Rover Figure 17 - New Range Rover.



Figure 17 - New Range Rover

The Following questions were asked :-

- What triggers the QA person to look at a concern?
“Depending on where the concern has been identified, as there is two scenarios which we as JLR are typical faced with, these are has the part been fitted to a car or not. If the part has been fitted to a car the vehicle it will be highlight that there is an issue with a part on the car, if the part hasn’t been fitted it is placed on a quarantine area however the car is still highlighted and the car is diverted with a part missing, due to JLR operating a sequencing system where each car is different.” In both incidents the operator informs the team leader who contacts line quality.”
- What happens to the defect?
“The defect has basic analysis done on it, so that information can be supplied to the supplier. The part is then made available for the supplier to come and collect to perform further root cause analysis on it.”
- What happens to the line stock?
“JLR use an external sort company which is based on site, when a defect is found Formal D will be requested to perform containment starting at the production line and working back to the stores.”
- What happens to the stock within the stores?
“All the stock within the stores is quarantined by Formal D and is realised to production after the sort has been completed. Also the supplier will be asked to provide safe cut off details which won’t require sorting.”
- What do the operators / line supervision do when faced with a concern?
“When a concern has been noticed the operator will inform line supervision who will call SPQ, the Figure 18 -JLR escalation matrix and Figure 19 - Supplier concern will then be followed.”

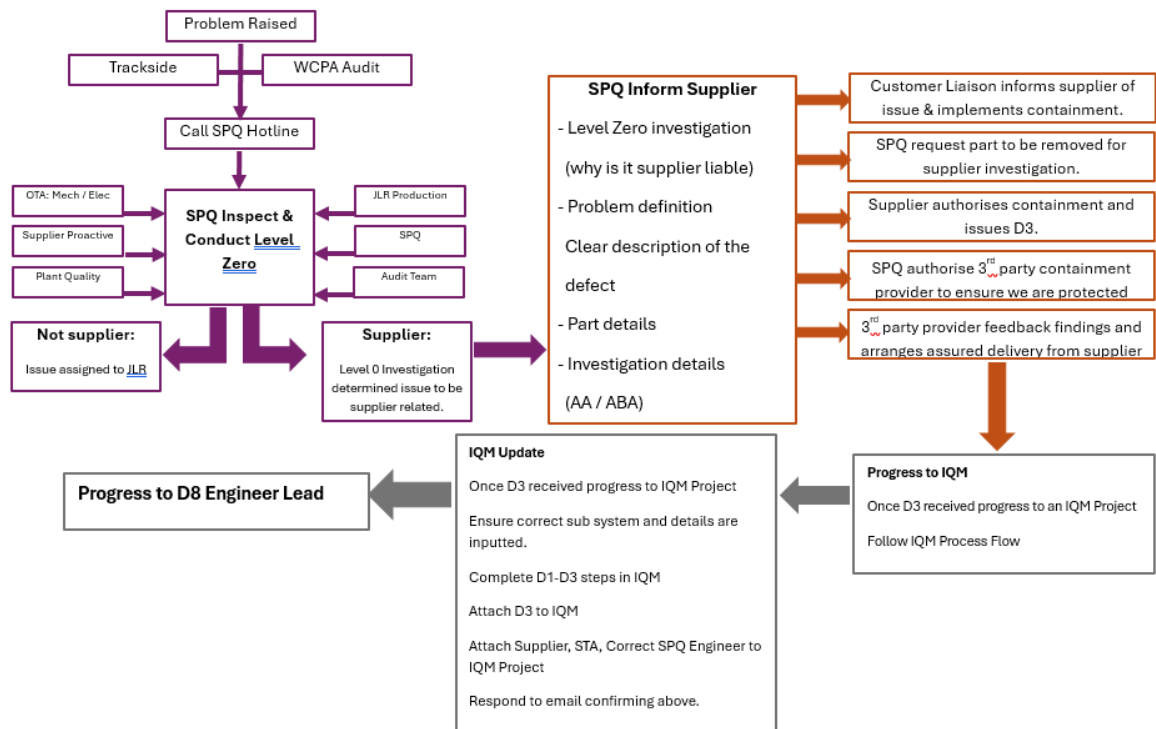


Figure 18 -JLR escalation matrix

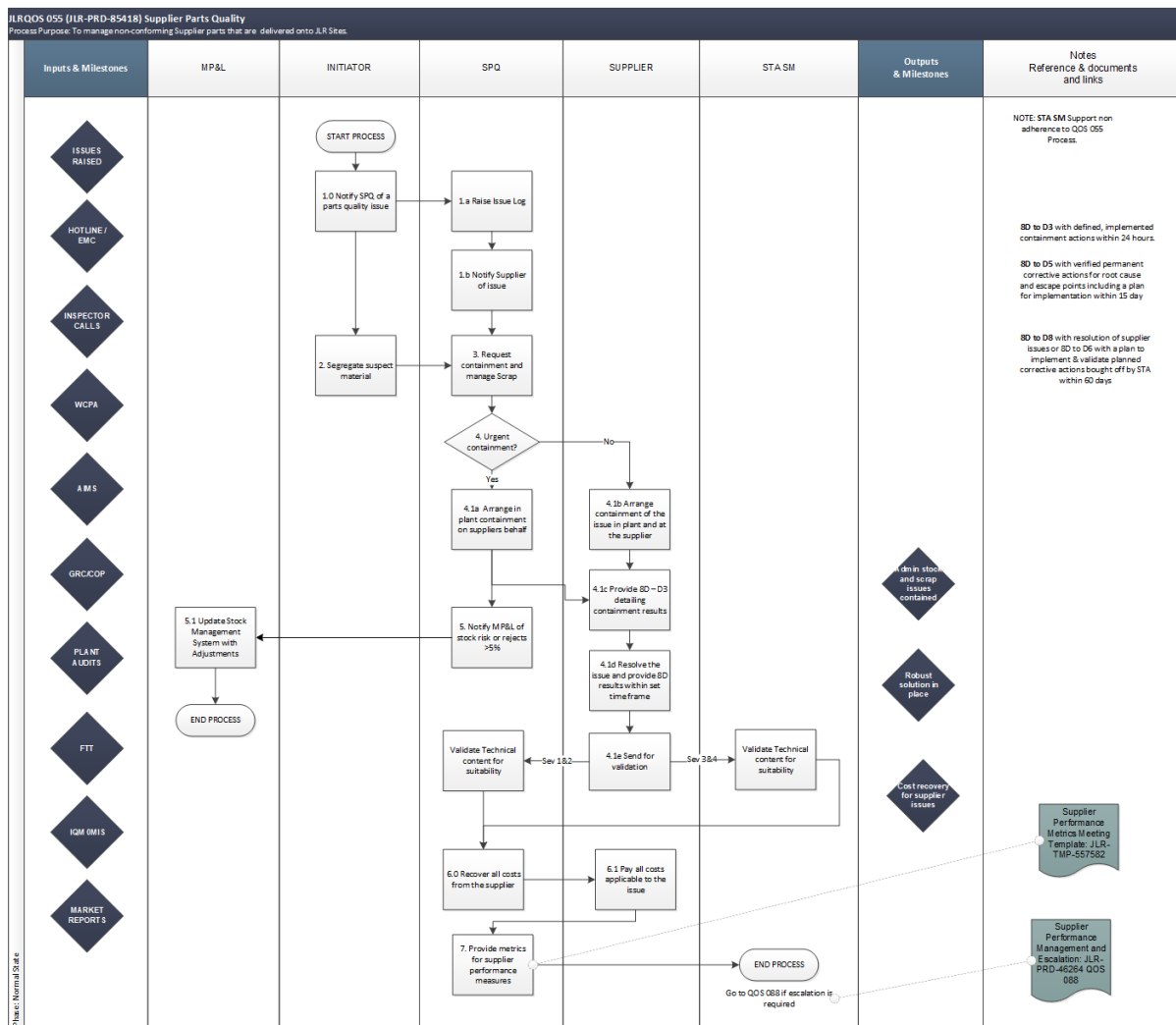


Figure 19 - Supplier concern matrix.

(Moore, 2024) (Simpson, 2024)

Quality

With MLUK being a direct supplier or known as a tier one supplier to all the above customers shown in Figure 3 - customer profile. It must achieve certification to supply in the form of IATF 16949 certification and without this certification MLUK will have to stop trading with the automotive customer. The reason for this is that IATF 16949 is a designed to ensure that the company is doing what it is meant to be doing and supplying the best quality product as by customer agreed specification by focusing on some key elements.

- **Customer Focus:** IATF 16949 places a strong emphasis on meeting and exceeding customer requirements. This includes understanding customer needs, providing defect-free products, and consistently delivering high-quality services.
- **Process Approach:** The standard adopts a process-oriented approach to quality management. Organizations are encouraged to identify, manage, and optimize key processes to enhance efficiency and effectiveness in meeting objectives.

- **Risk Management:** IATF 16949 requires organizations to identify and address potential risks within their processes. This proactive approach helps in preventing issues, ensuring product safety, and maintaining a robust quality management system.
- **Supplier Quality Management:** Recognizing the interconnected nature of the automotive supply chain, IATF 16949 places a significant focus on supplier quality management. Companies must work closely with their suppliers to ensure that quality standards are consistently met throughout the supply chain.
- **Continuous Improvement:** The standard promotes a culture of continual improvement, urging organizations to regularly assess and enhance their processes. This commitment to ongoing refinement helps companies stay ahead in a competitive market.

(Jama Software , 2024)



Figure 20 - IATF 16949

Although MLUK is IATF 16949 certification it doesn't prevent quality concern from happening internally or in some cases reaching the end user and becoming a OKm concern.

"The term "Okm" is widely used in many countries worldwide to describe vehicles and things that are in very close to the same condition as when they were manufactured, as in "like-new". This is because "Okm" is the term used in the automotive industry to refer to a brand new and unused vehicle that has not yet been driven nor registered for the first time."

(OKm.com, 2024)

As a tier one supplier any parts that leaves MLUK as a direct shipment into the OEM facility MLUK have to take full responsibility for. Even if MLUK do not make the part we still have to ensure that what we are supplying is OK.

OEM – Stands for Original Equipment Manufacturer, this is a terminology used when referring to the final manufacturing of the product in automotive for example Ford, Jaguar Land Rover , Volkswagen etc.

Quality review

Each function within the MLUK have key performance indicators or abbreviated to KPI's which have to be reported within the company on a monthly basis through management reviews, one of the main KPI's which is monitored within the quality department is PPM scoring from customers.

PPM or parts per million is a unit used when it looks at the number of defects which have been sent within a quantity of a million parts, for example 1 defect part sent within a million parts supplied would count as 1PPM.

(Sands, 2023)

This is displayed not only to management monthly but also to the shop floor in the form of a quality Q as shown in Figure 21 -Quality Q. This is very basic visual diagram which uses colours to indicate when a concern has been raised.

- Red -A concern has been raised within that month and is PPM scoring.
- Green – No PPM scoring concern has been raised that month.



Figure 21 -Quality Q

Using the information gathered by the PPM data, analysis can be done on the quality concern which have been raised to see where the focus of improvement needs to accrue. The data which I have chosen to look at starts at 2016 where the company achieved 0 PPM across all customers to the last currently full year which is 2023 where the company had 35PPM. This is shown in the graph below
Figure 22 - 2016 to 2023

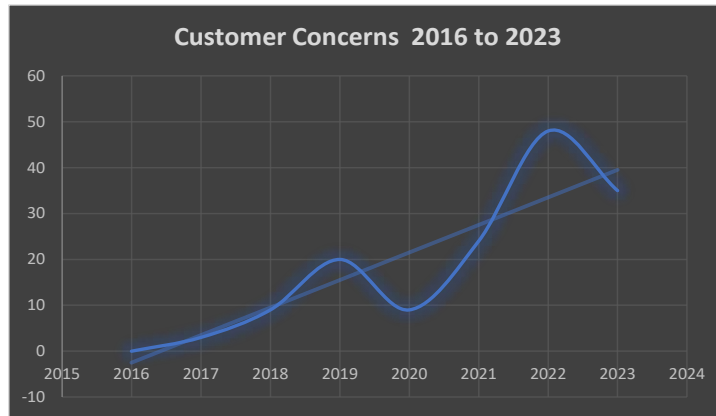


Figure 22 - 2016 to 2023

Looking at this graph there is an increasing trend of PPM apart from the data in 2020 where the graph has dipped, this however is due to a special cause within the data. When analysing any information it is important that all the details are captured as this could potentially lead you down a wrong investigation path.

In December 2019 the first detected case of nCoV or Covid 19 was found in China, this virus spread rapidly from China across to other countries all over the world. This in turn, led to the World Health Organisation declaring a public health emergency of international concern (PHEIC) on the 30 January 2020 and this then became characterized as a pandemic on 11 March 2020.

(WHO, 2024)

As a result of this pandemic, the United Kingdom was put on lockdown and all manufacturing facilities ceased production from 20/3/2020 with a phase return starting on 18/5/2020, directly affecting JLR which is MUK's biggest customer.

(Jaguar Enthusiasts' Club, 2020)

Just when the world was becoming more normal in the sense of production facilities re-opening with controlled measures in place, another disaster hit the automotive industry but this time in the form of the semiconductor shortage, this hit the automotive industry in 2021 and as a result 11 million vehicles had to be removed from production, consequently the global car markets sales were down 12 percent in 2021 compared again the last stable year in 2019.

(Applied Energy Systems Inc, 2023)

So how does this effect the data which is being presented in Figure 22 - 2016 to 2023, although the graph deviates away from the trend line we know why so the information which is being displayed is relevant and is still providing information which can be analysed, It clearly shows that something has changed since 2016 to provide MUK year on year increase in quality concerns relating to PPM scoring values.

Defect analysis.

Figure 22 - 2016 to 2023 clearly demonstrates there is a trend line that is going in the wrong direction however it doesn't provide any explanations as to what the concerns are, in order to establish this I will be looking at the 2022 concerns which were received from customer and categorising them into failure modes, which will hopefully prove a trend and an area to focus on.

In 2022 there were five customer concerns which resulted in a PPM figure of 48 these concerns were

1. Damage to the surface of a core matrix as shown in Figure 23 - matrix damage. This damage is caused to either the tubes / airways or in some case both by an impact from a foreign object.



Figure 23 - matrix damage.

2. Damaged parts being received in the pallet as shown in Figure 24 - damaged parts. This pallet has made it line side at JLR with the bottom frame on the MLA cooling pack snapped in half.



Figure 24 - damaged parts.

3. Bracket falling off radiator foot as shown in Figure 25 - Bracket fallen off. The plastic clip that latches around the end cap of the LTR providing a mounting location when fitted to the matting part at the customers assembly facility.

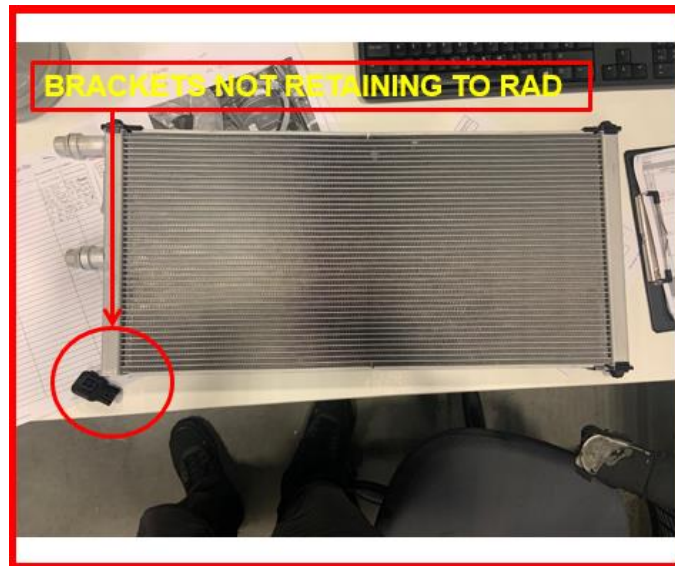


Figure 25 - Bracket fallen off.

4. Appearance standards on the Matrix of the core as shown in Figure 26 -Matrix . The three lines which can be seen on the core matrix is caused in the brazing process where the core matrix has come in contact with the braze clamp.



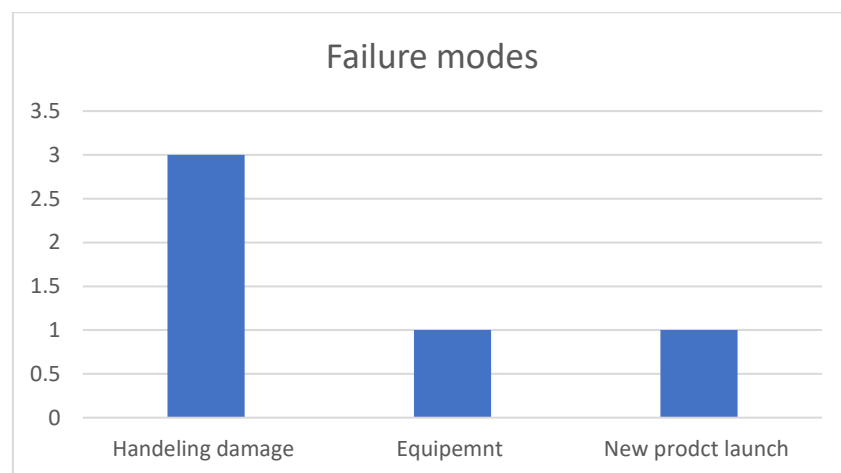
Figure 26 -Matrix appearance.

5. Moulding defect resulting in difficulty to fit mating part at JLR as shown in Figure 27 - Moulding Defect. Although this concern didn't prevent JLR from using the product the resistance due to the moulding being 0.1mm over top tolerance was slowing the fitment process down and potentially could have caused a repetitive strain injury on the operators.



Figure 27 - Moulding Defect.

Putting these defects in pareto graph based on their failure mode will provide the area where to focus the improvement investigation on.



What has changed in MLUK?

Looking at the main failure mode in the pareto graph it is clear that handling damage is the biggest concern providing the most defects to customers from MLUK. In order to understand what has changed in MLUK to contribute to these failures a Ishikawa diagram has been generated to see what aspects could have an effect on the quality concerns MLUK are seeing. This is shown in below in Figure 28- Ishikawa diagram.

To do this I have followed the example and the methodology used as part of my literature review, where the head of the fish will be increase in PPM and the main subheading branching off the main fish bone will be Manpower, Method, Machine, Material, Mother Nature and Measurement.

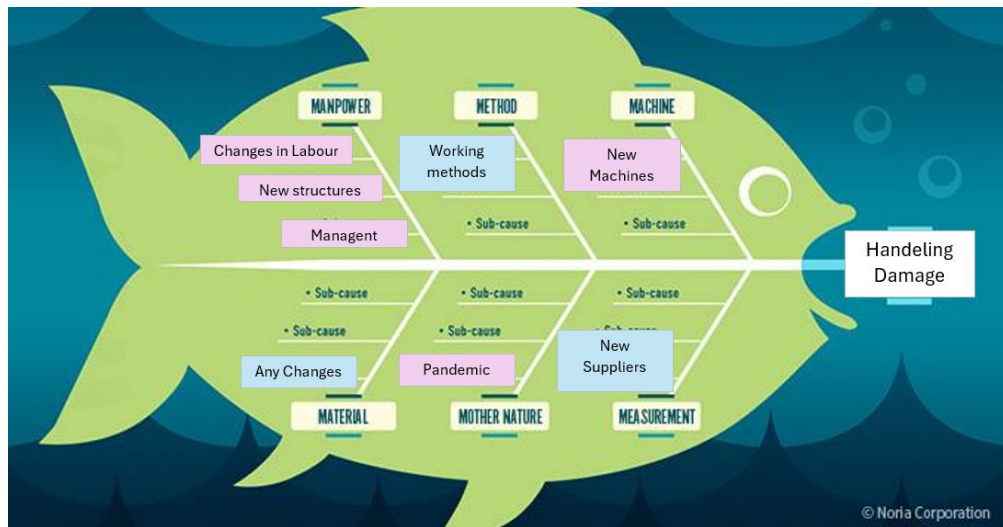


Figure 28- Ishikawa diagram.

Looking at what has been generated thought the fishbone diagram they can now be scored for the probability of contributing to the handling damage. Using a scoring range of 1 being very unlikely to 10 being the root cause. The scoring will be done by the whole team collectively.

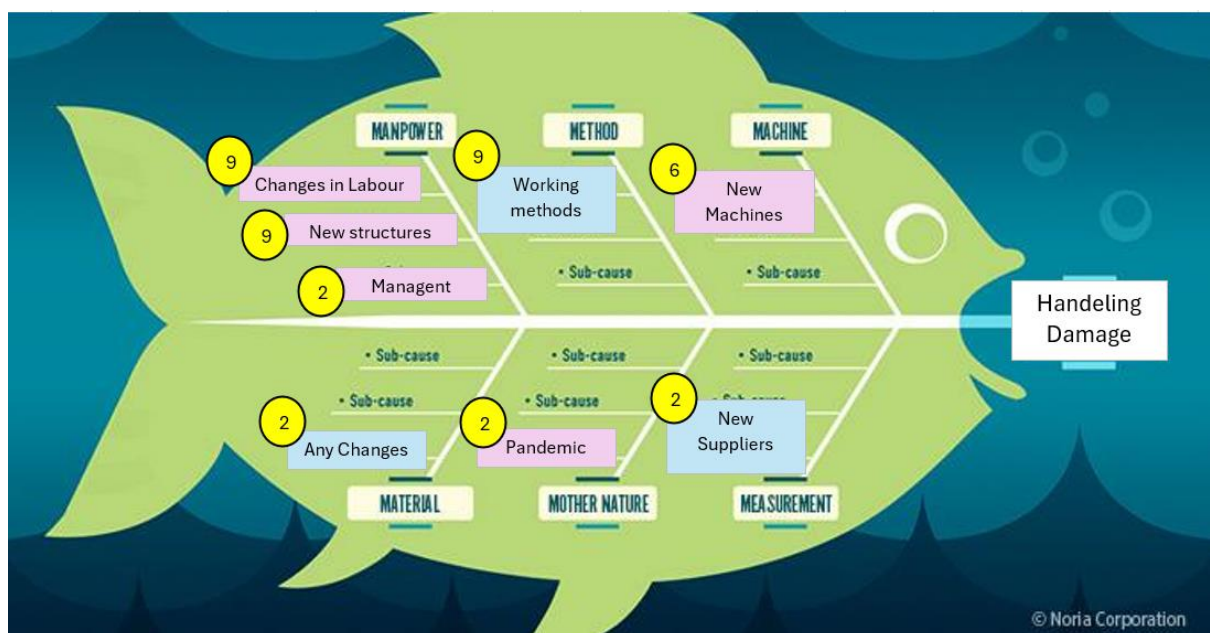


Figure 29 - Ishikawa diagram scored.

From this shown in Figure 29 - Ishikawa diagram the main areas to investigate are.

- Working method
- Changes in labour
- New structure

Working Methods

Standard operation Sheet (SOS)

All the operators within MLUK follow work instructions and method that are documented in standard operation sheets or SOS. These are individually written for each operation, documented with explanations and illustrations providing the operators a step by step set of instructions on how to complete the task within that working cell.

To ensure all operators understand the requirements explained in the SOS, a SOS observation is carried out by the line coordinator at a set frequency. If the operator is to remain with the same working cell then the SOS observation is carried out a set frequency of time. If the operator then changes roles and has to work in a different cell a SOS observation has to be completed within the their first shift in that cell.

Area / Line		OPERATION OBSERVATION SHEET QMS 2008										FY	24
Employee Name		Number		Reason for Observation		1. Production after long time.		4. Revision of STD Operation.		7. Operation condition change (4M).		10. Periodical Observation (12wks).	
						2. Change of operator.		5. Occurrence of accident.		8. Defect occurrence.		Plant MLUK	
						3. Skill training complete.		6. Return from support.		9. Judgment by supervising person.		Coordinator	
Skill Level Criteria				I Able to operate according to Standard Operation as taught				U Able to instruct contents of Standard Operation sheet					
				L Able to operate within standard time and handle characteristic, abnormal conditions				O Able to establish Standard Operation sheet and instruct contents					
Observation Check Item (Min. 5 Cycles Observation)		Date		10-1-24		4-4-24							
		Process No.		07414		07414							
		Reason for Observation		10		L		10		L			
1. Is the Standard Operation Sheet at the correct standard at the correct level EQ2-MG-003-2?				O		O							
2. Is the process followed and understood according to the Standard Operation? (Key Points, O, Quality Checks, Poka Yoke etc.)				O		O							
3. Are One Point Lectures or any 5Z Controls understood and being adhered to?				O		O							
4. Are all Tools and Gauges being used checked at the start of every shift: are undamaged, clean and stored in location?				O		O							
5. Is all required PPE being used / worn and no visible potential risk to the health and well being of the employee?				O		O							
6. Is the Operation Standard Time being achieved?				O		O							
7. Are Manual Handling Procedures being Followed, parts handled loaded and stored/packed correctly?				O		O							
8. Are there unnecessary items on the work bench (e.g., Are there more labels or items than required on the work bench)?				O		O							
9. Are parts clean and in the designated area and labelled correctly?				O		O							
10. No overstocking of components and FIFO rules being adhered to?				O		O							
11. Is employee aware and following the dropped parts piling?				O		O							
12. 5S - Area is clean with no rubbish or parts on floor, employee can demonstrate and explain 5S requirements and controls				O		O							
13. Can employee explain the rules and procedures for the process of reporting and handling abnormalities (QMS 535)? Stop - Call - Wait				O		O							
14. Is there a Quarantine, Hold / Reject container/trolley available and being used correctly?				O		O							
15. Is the handling method of a defect understood, are all defects and scrap parts being recorded?				O		O							
16. Is the employee conducting Machine Care Tasks (QMS434) and Checks(QMS 535) at the start of Every Shift and is aware of the desired conditions				O		O							
17. No omissions and correct entry of Quality Confirmation Check Sheets and All Data Gathering Documents (e.g. Where applicable completed hourly)?				O		O							
18. Check Finished Component/Part (a Off) visually and against Key Points of SOS and any Quality Standard Sheets for Product				O		O							
19. Does the employee have any difficulty or concern with the operation which could be improved?				NO		NO							
20. During the observation did the employee raise any improvement suggestions or are there any visible noticeable areas for improvement (include in Observation Results Section below)				NO		NO							
TOTAL EVALUATION				Stable		Stable		Stable		Stable		Stable	
C: Excellent Result (Excellent)				Not Stable		Not Stable		Not Stable		Not Stable		Not Stable	
Evaluated on Result Recording = Stable (Put O after observation)				Signature of Employee									
A: Not Stable (Need more instruction)				Signature of Team Leader									
X: Not Stable (Need complete instruction)													
S: Stable after instruction													
O: Stable after instruction													
Date		Observation Result: (Put O after observation)										Put O on	

Figure 30 - Example of a SOS observation

EQ-2-MG-003-2													Note: Record Plan and Result of Periodical Operation Observation																
Periodical Operation Observation Schedule													1. Issue: Make schedule month by month for the year																
													2. Check: Check result month on month for completion																
Key:													☐ Planned date		☒ Completion		☒ Planned Recheck date		①、②、③			▪ Operation Observation							
No.	Name	Clock No.	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27
1																													
2																													
3																													
4																													
5																													
6																													
7																													

Figure 31 - Example of SOS observation.

The SOS document also has a copy of the appearance standards which the operator has to acknowledge they have read during the SOS observation.

This demonstrates there is a good level of control on the shop floor and operators are aware of their roles and responsibilities and know what defects they are looking out for.

Quality concerns

When a quality concern occurs the the Stop, Call, Wait process is followed. This information is displayed in every cell in MLUK and explains what to do if an abnormality is noticed. This process is very basic and gives very little information on what to do at each stage of the process.

STOP – Stop the task which you are performing.

Call – call supervision which will decide on the department / individual who needs to be contacted.

Wait – wait until the process is corrected.

What is clear is immediately this process is entirely dependent on the operator performing the task to notice the first abnormality and immediately stop the process at that point. However what happens if the abnormality has been in production for the previous hour and only now the abnormality has been identified?

To understand this the above question was put to several coordinator.

Coordinator one “reviewing the concern and seeing that there is potential this concern has been happening for some time and would not be picked up further along the process, I would call quality”.

Coordinator two “I would start inspecting all stock around the cell to see if there is any other product displaying this concern”.

Coordinator three “All stock would be quarantined and quality would be informed to advise on the next steps”

All coordinators gave a logical and reasonable response and none of them were completely wrong. However, their responses were not consistent and in line with each other. Can it be guaranteed that the end customer is safe from not receiving an abnormality ? No it cannot.

Changes in Labour

One of the biggest changes which has happened to MLUK since 2016 has been the merging of Calsonic Kansei and Magnetic Marelli to form the company Marelli. Although from the surface a company merger shouldn't really affect the quality of the parts which we supply to our customers resulting in an increase in PPM. However, looking at Figure 29 - Ishikawa diagram scored. Under Manpower there has been several big changes due to the merging of the companies.

Although the companies didn't merge until 2019 Calsoinc Kansei was bought by an investment company in November 2016 called KKR, who immediately started to reorganise the work force by announcing a reducing program called SKYLINE, this reduced the head count across the whole of the factory, with a large number of indirect areas being affected as well as the direct work force.

When referring to a direct working, it means that they have direct contact with the product being produced for example a production operator. The opposite would apply to an indirect work where

although the work for the company they don't physically touch or make it, for example a quality engineer. (Indeed, 2024)

Looking at the change in labour within the quality department, in 2017 there was head count of twelve currently there is a head of six. This a 50% reduction in the size of the department within 6 years, understanding how the head count was previously deployed onto the shop floor to how it has changed.

MLUK factory is consists of a Mould shop, press shop / components area, production Line 1, Line 2, Line 3 and Line 4

In 2017 there were four engineers covering these areas in 2023 there is one, what this means is that quality departments time has to be highly prioritised. Customer concern will always be the highest priority, the quality involvement on the shop floor containment activities is going to be limited.

New Structures

The manufacturing supervision team has experienced a new structure as part of skyline. As a result of this another tier of supervision has been added to their team in the form of lead operators, their main roles and responsibilities is to support the manufacturing coordinators with their daily tasks.

Break Glass procedure.

Currently there is no procedure to follow when a quality concern arises from a customer or from an internal quality concern which requires the D3 from the 8D process to be followed which is containment. Although all departments are aware of containment which has been demonstrated in the coordinator's interviews. However, there is no structured approach to follow. People are left to implement their own methods which although can seem like they know what is happening. Basic things can be missed and when basic things are missed this means that the customer is potentially still at risk. Previously the quality department would take control of the containment process, but due to the reduction in the size of the quality department this control needs to be handed over to manufacturing.

For this to happen a successfully a procedure needs to be created providing clear guidance to be followed ensuring the concern is contained and the end customer is safe .This new process has been developed by myself Adam Evans with the 8D principle in mind up to D3, making it user friendly and uncomplicated so that anyone can follow.

When looking at the 8D process in particular up to the D3 process they all ask for similar information

D1 – is all about the detail, who is in your team? what is the part number? when was it raised? and where was it raised? Shown in Figure 32 - JLR UK 8D D1 and D2

D2- What is the problem, why is it a problem, this should include photos evidence of a good part and of a bad part. Shown in Figure 32 - JLR UK 8D D1 and D2

D3- How many parts do we have around us? what locations are they in? how many are good? how many are NOK? and what is being done to identify the good part? This is shown in Figure 33 – JLR UK 8D D3

1. Create The Team & Problem Introduction					
Supplier: MLUK		Customer: JLR		Part Name:	
				Customer Part Number:	
Champion		Team Members: Adam Evans, Andrew Hughs, Barrie John		Supplier Part Number:	
				Sub-Component Name:	
				Sub-Component Part Number:	
				Program/Vehicle/Product Specifics:	
2. Define The Problem					
WHAT:	WHERE	WHEN:	WHO:	HOW:	
Problem Reported		Problem Defined		Evidence of Problem (Photo/illustration/Example)	
				NOK Condition (Current State)	
				OK Condition (Desired State)	
Reoccurrence History Log		Any additional comments			
Date	Qty				

Figure 32 - JLR UK 8D D1 and D2

3. Containment Actions						
Containment Actions						
Any holding site		Supplier		Customer		In Place?
Containment Action Verification						
Start Date	End Date	Quantities	Any holding site	Supplier	Customer	
						100
						80
						60
						40
						20
						0
						Any holding site Supplier Customer
						100
						80
						Any holding site Supplier Customer
Assured VIN / TLS						

Figure 33 – JLR UK 8D D3

As I wanted this process to be interactive and easy to use I created it in Excel. By using hyperlinks at each stage the users can click on the title which is applicable to them directly to the appropriate page. The name of this process was decided as “Break Glass” as to relate to the example when faced with a fire and it needs containment the glass is broken on the fire alarm (Figure 34 -Break Glass procedure front page), This is the front page of the procedure and the first clickable title.



Figure 34 -Break Glass procedure front page

When this Tile is clicked it takes the user to the main page of the Break Glass procedure Figure 35 - Break Glass concern Matrix. This has been developed showing the step by step process which is to be followed by all to ensure the procedure is completed correctly and the end customer is safe.

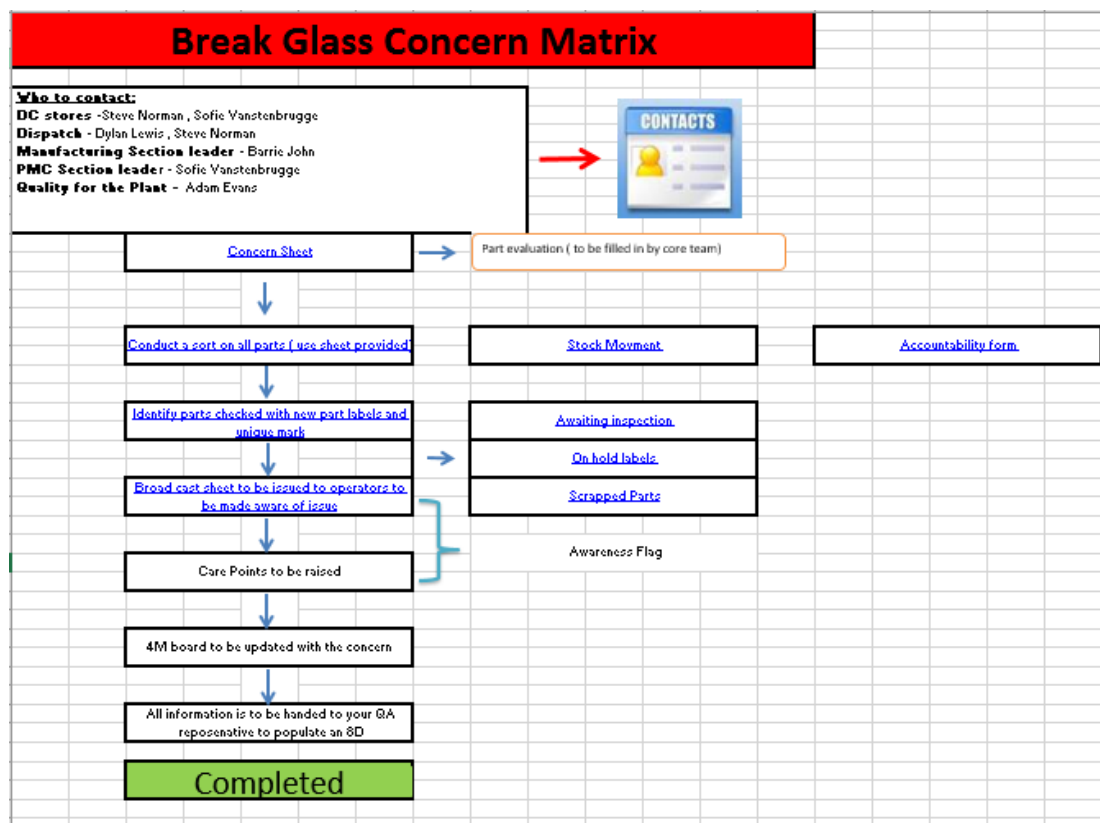


Figure 35 - Break Glass concern Matrix

Along the top of the concern matrix screen are a list of contact and what department they work in, this can be expanded if the contacts icon is clicked, giving telephone numbers and email addresses to each of the people, and also the contact details of managers if needed. Figure 36 - contact

Contact list			
Who	Email address	Phone number	Department
Logistics			
Penrl Evans	Penrl.Evans@marelli.com		ISS
Carle Vandenbrugge	carle.vandenbrugge@marelli.com	0757086428	Proc Section Leader
Paul Herbert	Paul.Herbert@marelli.com		Proc Engineer
Kelvin O'Keefe	kelvin.o'keefe@marelli.com		UK stores
Kelvin Phillips	kelvin.phillips@marelli.com		OP stores
John Phillips	john.phillips@marelli.com		Proc Sec
Manufacturing			
Bernie John	bernie.john@marelli.com	07772531995	Manufacturing Second leader
Chris Spencer	chris.spencer@marelli.com	07970839134	Manufacturing
Line 1 Coordinator		07971304262	Manufacturing
Line 4 Coordinator		07772531802	Manufacturing
Components coordinator		07571331347	Manufacturing
Quality			
Adam Evans	adam.evans@marelli.com	07772710264	QA Senior Engineer
Richard Mills	richard.mills@marelli.com	07305176307	QA Section leader
Managers			
Hugh John	hugh.john@marelli.com	07527530983	QA Manager
Brandon Williams	brandon.williams@marelli.com	07814767185	Plant Manager
Andrew Hughes	andrew.hughes@marelli.com	07570265404	Engineering Manager

Figure 36 - contact list.

The first sheet which the user comes across which requires an input is the concern sheet. This is where the similarities from the 8D process are first seen. Figure 37 - Break Glass concern sheet 1

Concern Sheet Report		
Person filling in form		
Time and Date reported		
Product part number		
Product description		
QTY affected		
Who is reporting the issue		
Concern Description		
Who has been informed		
Shift A sign	Shift B sign	Shift C sign
STAFF:		

Figure 37 - Break Glass concern sheet 1

The first information required is basic however it begins to provide the first stage of control which can be seen typically in D1 of any 8D problem solving process.

The following questions are asked:

- Who is filling out the form?
- Time and date it was reported.
- Part number of the product affected.

The next section on the sheet goes into the D2 element of the 8D process.

- Who has told you about the concern?
- What is the concern? This can either be descriptive or an image.

On the is who has been informed aspect of the concern, it is a requirement for all three shift coordinators to sign the sheet. This ensures that all three shift coordinators are aware of the concern and know what is happening with the containment.

The second half of the concern sheet Figure 38 - Break Glass concern sheet 2. Focuses on D3 and the containment of the product, it gives various locations to check, details of how many part are in that location, who has inspected the part and the quantity of how many are NOK against OK parts. Another key element of the 8D document is how the parts are identified, this can be in the form of boxes be labelled and or a confirmation mark on the product in the area where the concern has been identified. This is to provide a quick visual to anyone, identifying the part have been checked for the concern.

In any containment activity it is essential the first place to check is the dispatch area and the last place is the initial part production line, or the stores if it is a bought out part. This is to ensure that any part that may imminently leave MLUK is safe to do so. Also the amount of NOK parts can be established and taken into consideration as potential MLUK may a shipment into the customer. Which they need to be informed of.

Location	Quantity	Inspected by	Result ok / Nok	Date comp
Dispatch				
On line (child parts)				
On line finished parts				
DC stores				
Kanban in stores				
RE-Work Area				
Mould shop				
Components area				
Tryout / on hold parts				
How are the parts identified to show they have been checked				
When form is completed please sign and date and hand it to your section leader				
filling out form Sign and date			Section leader sign and date	
Part Shipped to customer affected		YES		NO
Is further analysis required		YES		NO

Figure 38 - Break Glass concern sheet 2.

With the concern sheet report form, anyone can come along pick it up and get an understanding of the concern and what control measures are in place to contain it. This is an essential key to the process as the main part of containment is being in control of the issues. If you lose control, you can easily lose all traceability and put the end customer at risk again.

The next sheet Figure 39 - Stock Containment sheet within the break glass procedure provides an extra level of control during the sorting / checking of the parts process.

Stock Containment / checked					
<u>Date</u>		<u>Part Number</u>		<u>Location checked</u>	
<u>QTY in location</u>	<u>Issue :</u>			<u>Checked ID</u>	
Last Known Good part produced		Date		Time	
When doing the sort activity and you are decanting from one box to another please ensure that the box labels move with the parts					
Box QTY checked	Issues		Label Moved	Date on Box	OK Parts

Figure 39 - Stock Containment sheet

In Figure 38 - Break Glass concern sheet 2. It asks for details of the sort in each location but is only an over view to the number of parts in that area, In the Figure 39 - Stock Containment sheet breaks down whole number of parts in that area to individual boxes. For example in the stores there could be 500 parts in total, these parts are in boxes of 100 and these parts are also made on different dates Figure 40 - Stock Containment .

Stock Containment / checked						
<u>Date</u> 4/2/2024		<u>Part Number</u> 1234		<u>Location checked</u> Stores		
<u>QTY in location</u> 500	<u>Issue :</u> Short Shot on Parts			<u>Checked ID</u> AE		
Last Known Good part produced		<u>Date</u>	28/01/2024		<u>Time</u>	
When doing the sort activity and you are decanting from one box to another please ensure that the box labels move with the parts						
Box QTY checked	Issues		Label Moved	Date on Box	OK Parts	NOK Parts
100	Short Shot		No	01/02/2024	0	100
100	Short Shot		No	01/02/2024	0	100
100	Short Shot		No	28/01/2024	75	25
100	Short Shot		No	28/01/2024	100	0
100	Short Shot		No	28/01/2024	100	0

Figure 40 - Stock Containment example.

From the information in Figure 40 - Stock Containment it will give the user a clear cut off of OK and NOK part so that the line can keep producing. It also shows when the concern happened which was on the 28/01/2024 three quarters of the way through run meaning anything after that date will be NOK which has also been proven during the sort activity.

As part of the containment activity all the stock will be labelled up to give clear visibility to anyone to what status the parts within the box are at.

- When the parts have been checked and are okay to be used going forward a new part label Figure 41 - New Part Label is attached to the box, this is not only applied to internal parts but

the part going to the customer. The new part label will provide them a clean cut off telling them that the parts are okay and there is no need to inspect them for the defect.

		QMS645	
		NEW PART LABEL	
Part No:	1234	Part Name:	Plastic Tank
Change Details:	Check for short shot and OKAY		
Parts under containment		→	
Initial Production of →	Engineering Change / New Parts		
	Problem Countermeasure	X	
	Production Process Change		
Date:	04/02/2024	Sign:	AE

Figure 41 - New Part Label

- Awaiting inspection label Figure 42 - Awaiting inspection , this label is applied to the stock which has been quarantined and provides anyone with information to why the part is awaiting inspection, this is for internal use only.

Awaiting Inspection	Date	Part Number
	Description/ Reason	
	QTY of units	Signature
	Other information	

Figure 42 - Awaiting inspection label.

- On hold labels, Figure 43 - On Hold Label, this label is to be used after parts have been inspected and potentially require further action on them. Or the person conducting the sort is unsure and needs a second opinion

HOLD	Date	Part Number
	Description/ Reason	
	QTY of units	Signature
	Other information	

Figure 43 - On Hold Label

- To be scrapped Figure 44 - To be scrapped , this label is to highlight that the parts are NOK and need to be scrapped.

To Be Scrapped	Date	Part Number
	Description/ Reason	
	QTY of units	Signature
	Other information	

Figure 44 - To be scrapped label.

At this stage of the break glass process containment has been carried out with all parts being quarantined, checked, documented and a level of control has been established providing reassurance the customer is safe from receiving anymore NOK parts.

The next stage of the break glass process again following the 8D process and the D3 element is communication of the concern. Making everyone aware of the concern who directly deals with the parts. This again is part of the containment and acts as check the checker as for a set period the operators will perform extra checks, this may include inspecting the parts in the area of concern and marking them with a unique mark as confirmation the part has been checked.

To ensure all operators who deal with the parts directly are aware of the concern and understand it, they are asked to read a broadcast sheet Figure 45 - Broadcast and sign after they have done so.

		Customer Concern Communication Sheet					
Date:		Concern		Please sign below to show you understand the concern and actions			
Part Number(s):		Description:		CLOCK No:	NAME:	SIGNATURE:	COMMENT:

Figure 45 - Broadcast sheet.

Also to be displayed in the cell is a care point Figure 46- Care which is an extract from the broadcast sheet as a reminder what is required as part of the additional check.



CARE POINT

+

Title xxxx

Description on of the concern and what to do

Figure 46- Care point.

The care point although a temporary visual instruction, if deemed necessary it will be added to the SOS document and become a permanent check for the operators to follow when performing that task. This again is part of the 8D process although part of D7 – Take preventative steps although not of the break procedure to add information into the SOS the relative information has been generated and can be used.

The next step is to make a note of any additional process on the 4M Figure 47 - 4M record which is a change capture document associated to each production line and displayed at the Quick Response Quality Meet or QRQC which happens daily. The 4M document can be used for traceability purposes if there is an issue in the future.

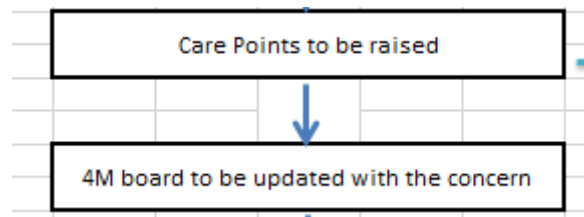


Figure 47 - 4M record

The final part of the break glass procedure is the completed break glass procedure document Figure 48 - completed break glass. This is a summary of the whole process which has been carried out but not in the form of quantifying the issue with numbers, it's a summary of the tasks that have been completed and on what date.

It also asks to provide samples of the new part labels, broad cast sheet and care point to build up the evidence pack. It has a reminder to remove all labels which have been placed on the boxes that are no longer needed. i.e. on hold. This is because as MLUK part boxes are reused, there could be potential that the box is used again with the label still attached which could lead to good parts being put on hold or even scrapped off.

Completed Break Glass Procedure		
Product:		Date:
Brief fault description:		
Procedure	Completed	Date
Concern Sheet		
Part Evaluation		
Sort Of Parts		
New part label (provide sample)		
Broad Cast Sheet (provide sample)		
Care Points (provide sample)		
Removed labels - await inspection / on hold / scrapped		
Additional documents:		
sos	PCP/PS C	FMEA

Figure 48 - completed break glass.

The key to the completed break glass document is that it has be handed to the manufacturing section leader Figure 49 - completed break glass . This ensures that the break glass procedure has been completed correctly and identifies someone who is accountable for its correct completion.

Section leader signature

Figure 49 - completed break glass signature.

Break Glass Training

When rolling out any new procedure which is a new working method training should be given to all manufacturing supervision ensuring that everyone understands the new protocol, any questions and concerns can be raised and addressed. This was the case for this new procedure I arranged training with all 3 levels of the manufacturing team section leader, coordinator and lead operator this ensured that all the line supervision could support or run a break glass procedure if required Figure 50 - Break Glass training



Figure 50 - Break Glass training

This training went through step by step of the new procedure, providing the manufacturing team with both a digital copy and a hard copy of the Break Glass procedure.

In order to ensure that the training has fulfilled its requirement each training group was put through a scenario with a series of questions. To do this I used a genuine concern received from JLR though an email. Figure 51 - Break glass training

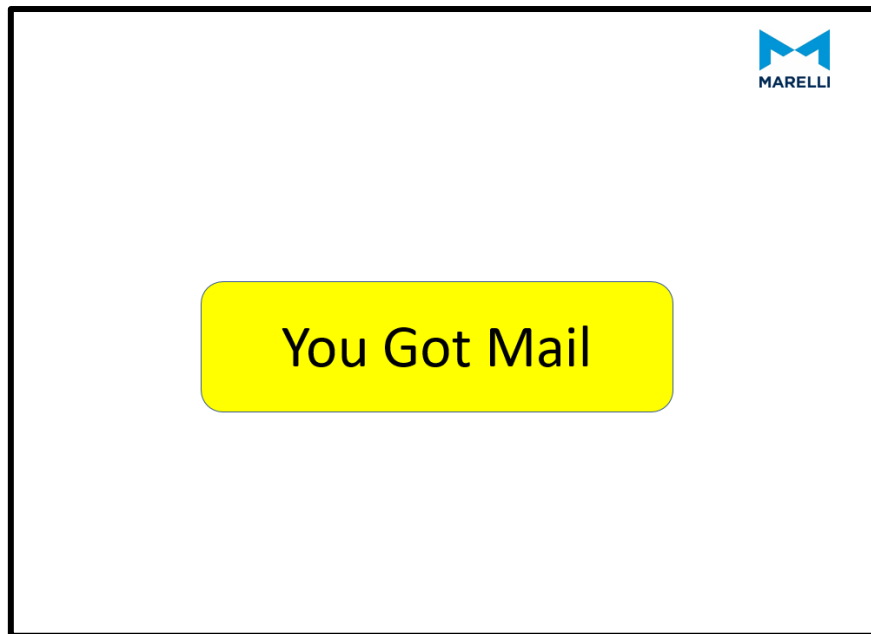


Figure 51 - Break glass training example.

Images of the concern area are shown, with a brief description to what the concern is, from this the team need to decide what needs to be done. Figure 52 - concern description Figure 53 - concern

Supplier Parts Quality Summary			
E Tracker / NCM	11925428 / NCM:166572		
Part No / Name	HK83-8005-AB / Radiator		
Quantity Affected	1		
Defect Details	Supplier fail label on radiator		

Figure 52 - concern description

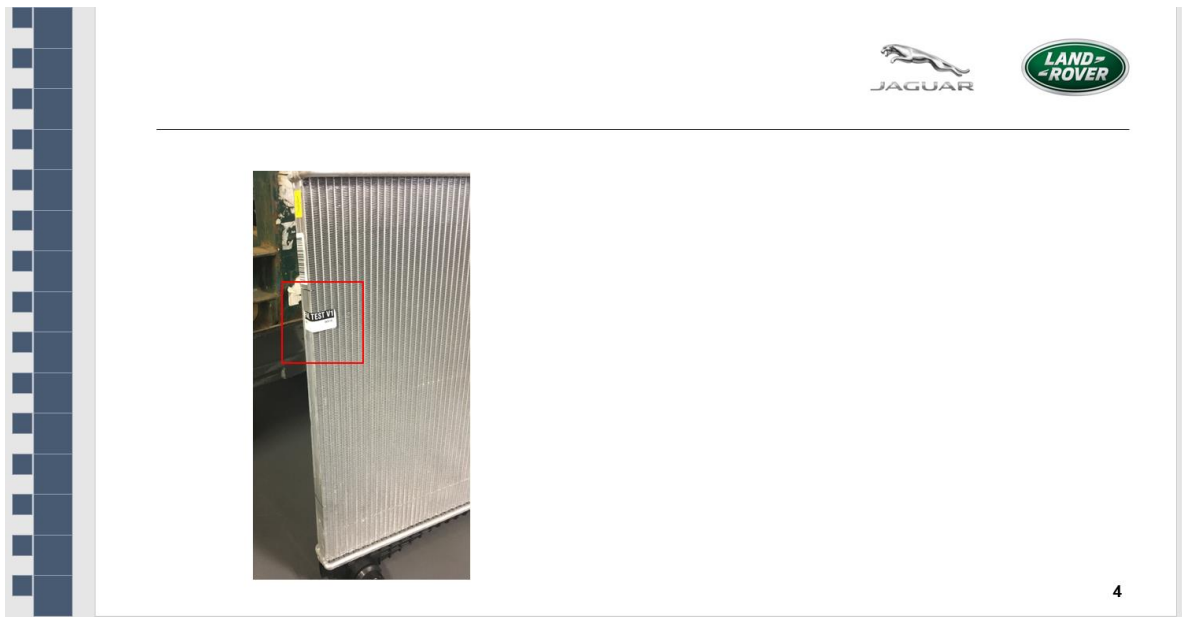


Figure 53 - concern image.

For this I asked them to break the information down to understand the risk

- What is the concern
- How many part are affected
- What effect does it have on JLR

Figure 54 - concern information analysis

JLR concern Information Break down
• They have a concern with a fail Label stuck to the side of a D7A radiator • Number of cores affected is 1 • Disruption to the Line because they use a pick system and sequencing

Figure 54 - concern information analysis

The reason I asked this question, is to ensure that MLUK employees can extract the correct information needed from the information which has been provided by the customer. If the information was interpreted incorrectly a break glass could be done checking for a concern which does not exist missing the true concern.

Now that the team understands the information the next stage is for the group to break glass as this is a training exercise, I asked the following questions to ensure that the break glass is performed correctly. Figure 55 - Break Glass questions

- What is the first thing you must do when you start the break glass procedure?
[Quarantine all the stock, labelling up boxes if required.](#)
- Where do you start the inspection from?

The first place you must check is dispatch, working you way backward to the component level.

- What document is used during the sort activity to capture all the information?
Stock containment / check sheet
- What is done to the parts / boxes to show they have been inspected?
A unique mark is applied to the area if possible, also a new part label is attached to the out side of the box / stillage.
- Which document remains live during the break glass and is filled out when areas of the sort are completed?
The concern sheet report is updated when sorts have been done with the number of OK and NOK parts.
- Who should be informed of the break glass?
Management and quality should be informed, but the most important is the next shift so they are aware of concern and the break glass activity which is happening.
- When the break glass is completed who is the pack handed too?
The line section leader is handed the pack to ensure it has been completed correctly.

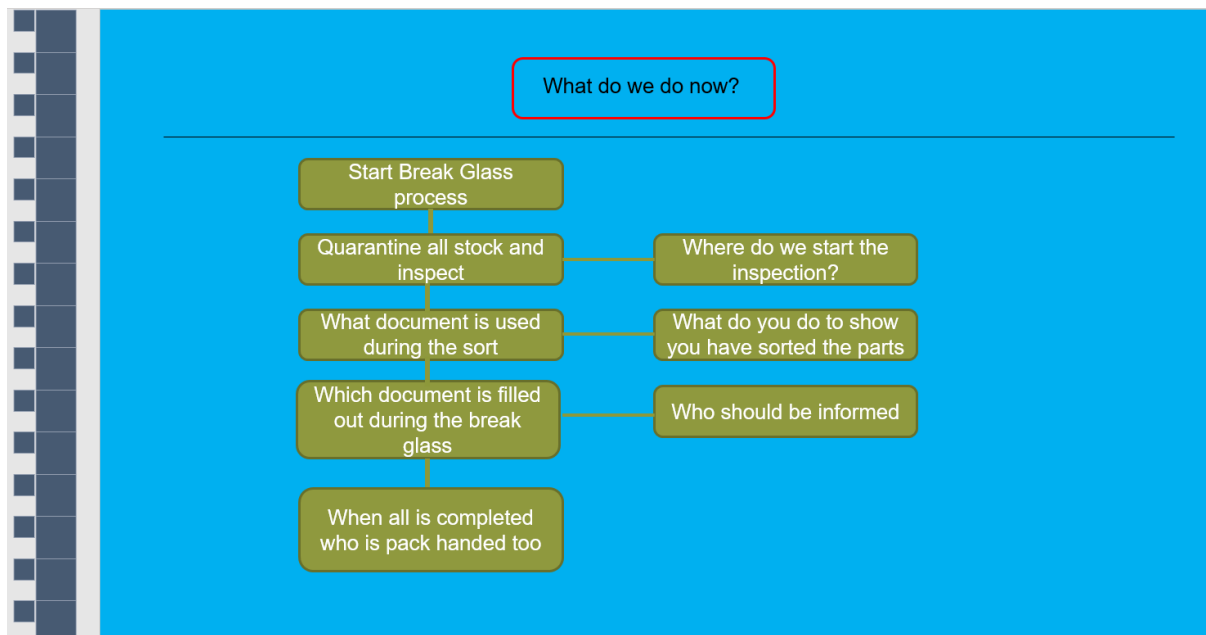


Figure 55 - Break Glass questions

Feedback from manufacturing supervisory team

To get a broad range of feedback from the manufacturing team I asked three different levels within MLUK, lead operator, coordinator and manufacturing manager, what they think of the break glass procedure? and how it will benefit them going forward? If they are faced with a concern.

Lead operator.

“When I attended the break glass training it was clear that it was a beneficial system to have in place at our plant considering the industry and environment we are in. Adam organised the training professionally and presented it in a manner which helped understand the importance and the workings of the break glass system. The power point was put together very well with internal break glass procedure described and laid out clearly. During the training we were handed a paper copy of the presentation which helped with the following of the presentation, the digital presentation was available to us after the training. The training put together by Adam has proven to be a positive here at the plant with it being utilised a few times since I have been here, potentially saving a large loss to ourselves and our customers”. (James, 2024)

Coordinator

“ After using the break glass procedure recently when dealing with a customer concern, I found it easy to follow and well structured, During this containment I had to provide a regular update to management team and due to having all the information to hand it was easy which provided them with the recurrence I was in control of the situation” (Spencer, 2024)

Manufacturing manager

“When a concern has been received from the customer, I expect that containment is done correctly ensuring the customer is safe, this can either be an internal concern between manufacturing lines or a OKM concern at the end customer. With the process Adam has created and the training he has provided I am confident that when the break glass process has been initiated the manufacturing team can contain an issue correctly, providing feedback to where we are with the containment, what areas area effected and how many parts have been affected. From this I can calculate the risk to supply, which is critical within manufacturing as we need to do two things, containment of the concern and asses the risk to supply, which this process provides all the information to make decisions. Also with the easy step by step flow to follow it also keeps me away from the concern providing an escalation level to the concern if required.” (John, 2024)

From this feedback it can be seen that each level of the line supervision team have benefited from the break glass procedure.

Conclusion

From analysing the data provided by customer quality concerns a trend could be seen within these quality concerns which was heading in the wrong direction. It was established that the type of concerns were not poka yoke related failures but there was a process which wasn't being done correctly in the form of containment. This began when Skylin the redundancy program was implemented which affected a large section of the indirect work force. Although the functions were still supporting each other but due to the limited resources the level of support became reduced. As the support functions were dealing directly with the customer, meaning they were unable to provide as much support as previously provided in activities on the shop floor.

During several interviews with the coordinators, it was clear that there was a level of understanding of containment however it wasn't a structured approach or a repeatable approach across the line supervision team as each coordinator would carry out the containment activity in a slightly different way. With the new level of lead operator supervision being introduced the manufacturing team became stronger across the three-shift pattern however there still wasn't a structured procedure for containment when a quality concern was to occur.

Utilising the 8D format for containment I created a procedure which could be followed in a step by step format and by any level of the line supervision team. The information that would be generated at each stage of the containment could be provided to management ensuring and providing evidence to them that the containment was in control and the end customer was safe.

With this new procedure training was provided which ensured that all the manufacturing team understood what to do when a quality concern arose and how to follow the break glass procedure. As the manufacturing team now all follow the same procedure, they can work together or side by side when doing the break glass with all the information being captured on the same document. This creates a consistent approach in MLUK when carrying out a containment activity.

Since the rolling out of the break glass procedure it has been used several times and has all worked very well, with each incident instilling confidence that the customer is safe and all the stock within MLUK has been checked and identified correctly.

As this procedure is currently only for a quality concern which requires containment within manufacturing, I am looking at how it can be laterally deployed to other functions within MLUK. One example it could be used for in the maintenance department, is if they have a concern with a sensor on a machine, a break glass procedure could be carried out to ensure all the machines that use the same type of sensors are checked in order to prevent further known concerns in the future. Another area within MLUK where this may benefit is the stores area. The stores area is currently an independent facility run by an external company. When a break glass procedure is carried out MLUK rely on the stores employees to remove all from the stores and placing it in the quarantine area for MLUK manufacturing team to check. By introducing break glass onto the stores, they could perform their own containment activity with full traceability and accountability for parts held there.

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