BAYSIDE MALL
MARKETING SOLUTIONS

BAYSIDE MALL
15 RICHMOND STREET
TORONTO - ON

QUALITY MANAGEMENT SYSTEM

MONTH REPORT - SEPTEMBER-2023

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ABSTRACT

Our journey through the Bayside Mall has been a rigorous investigation of problem-solving and strategic execution in our pursuit of retail perfection. Our focus has been on elevating the mall's standards, from optimizing the customer checkout experience at Sport Chek during Black Friday, where we addressed issues of time management, bottleneck creation, reputation loss, and employee efficiency, to addressing lavatory cleanliness concerns using Statistical Process Control (SPC) and Control Charts.

As we investigated the launch of Maple Mart, a new retail outlet, our attention was drawn to the Production Part Approval Process (PPAP). We assured us that the milk products sold at Maple Mart correspond to the highest quality and safety standards by thoroughly examining the 18 PPAP aspects, which ranged from design documents to customer-specific criteria.

Our strategy has been all-encompassing, encompassing constant progress, client satisfaction, and rigorous adherence to industry standards. We contribute to Bayside Mall's overall excellence by reaffirming its status as a premium retail destination that prioritizes quality management and customer happiness.

INTRODUCTION:

Spanning two downtown city blocks and featuring over 110 stores in a vibrant and spacious retail setting, the Bayside Mall warmly welcomes millions of Canadians and international travellers annually, standing as a premier attraction rivalling even the CN Tower in the city. Undergoing significant enhancements since 2007, the shopping center boasts a modern food court and renowned brands like Victoria's Secret and Michael Kors. In 2014, Adidas and Nike became noteworthy additions to the mall's diverse retail lineup.

When it opened in 2001, the Bayside Mall set new standards in retail architecture and shopping experiences. Known for elegant stores, a hassle-free returns policy, the annual Santa Claus parade, and a ubiquitous home catalogue, Bayside holds a special place in the hearts of Canadians.

The flagship location on Richmond Street in Toronto left a void in the hearts of Canadians who cherished their shopping memories and catalogue perusals. Find the Bayside Mall at 15 Richmond Street, between Victoria Street, Yonge Street, and Yonge and Bay.

QUALITY MANAGEMENT IN BAYSIDE:

Bayside Mall's Quality Management System (QMS) displays a dedication to providing an extraordinary and seamless experience for its guests. The mall's QMS, which incorporates industry best practices, is meant to assure the highest standards in all operations. Every element is methodically handled to meet or exceed client expectations, from its facilities' cleanliness and safety to its employees' professionalism and civility. The QMS also includes vendor connections, ensuring the mall's products and services meet high-quality requirements. Regular audits, feedback channels, and continuous improvement programs are essential components of Bayside Mall's QMS, indicating a commitment to meeting and continually raising the bar for retail and entertainment excellence.

We were really excited at first when we joined the QMS team, and after a month, we completed three quality projects to improve different strategies to help build and maintain the mall’s reputation.

OUR WORK ON WEEK 2

The second week, we had a problem with Sport Chek, where they had an issue in the checkout process during their last Black Friday sale. So, our QMS team created a solution strategy for this by a series of solutions and new methods to reduce the bottlenecking and improve customer satisfaction.

Here, we used the GAP analysis to find the gaps that block the improvement, and we gave solutions to reduce these gaps to restore success.

PROBLEM STATEMENT

Sport Chek experienced long queues and waiting times on Black Friday last year, leading to customer frustration and dissatisfaction. Therefore, this year, they aim to improve customer checkout efficiency by falling within the scope of ISO 9001.

TARGET

Keep in mind that the objective is to reduce customer waiting times, create a smoother flow, and enhance overall customer satisfaction for the upcoming Black Friday.

GAP ANALYSIS

The gap analysis for improving customer checkout efficiency and reducing waiting times at Sport Chek during Black Friday involves comparing the current state of the checkout process with the desired shape aligned with ISO 9001 standards. The important gaps we found in achieving success in meeting customer satisfaction and reducing frustration are as follows,

The major GAPs we found,

TIME MANAGEMENT

Time management would be the major problem; with the limited number of employees, they could face issues during peak hours. This will affect the checkout timing, and customers might be particularly irritated by slow checkouts. Waiting in long lines or dealing with a time-consuming checkout procedure can cause frustration and unhappiness, which may discourage customers from making future purchases. A smaller number of checkout counters also adds more problems on this topic.

CREATING BOTTELNECK

When a sale is on, people will be urged to purchase their Wishlist items on the sale day to make a profit; this will ultimately invite more and more customers to the store. This will create a bottleneck effect over the course and create chaos. This bottleneck issue creates negative efforts on the checkout by confusion. Here, people want to skip lanes and try to move out as soon as possible, leading to potential theft problems.

REPUTATION LOSS

This is the main disadvantage, as a result of this problem people feel not to revisit the store in any future. A bad reputation for long checkout lines can hurt a company's brand image. Everyone has social media at their fingertips, so this issue can be shared through social media and create a bad name for their brand, causing the company's image to suffer further.

EMPLOYER'S INEFFICIENCY

Slow checkouts can also indicate operational inefficiency within their store business. It shows inefficiency in staffing levels, technology, or processes that must be addressed to improve efficiency.

SOLUTIONS TO REDUCE GAPS

Identify Performance Gaps:

Compare the existing checkout process with the ISO 9001 standards. Identify gaps or discrepancies between the current practices and the means. These gaps could be in speed, accuracy, customer interaction, or any other aspect outlined in the ISO 9001 standards.

Prioritize and Analyze Gaps:

Evaluate the identified gaps regarding their impact on customer satisfaction and operational efficiency. Prioritize the gaps based on severity and potential for improvement.

Propose Solutions for Gap Mitigation:

Develop tailored solutions to bridge the identified gaps. These solutions should align with ISO 9001 standards and address the specific challenges faced during Black Friday sales, aiming to enhance checkout efficiency and reduce waiting times.

The gap solutions are as follows,

1) Checkout processes

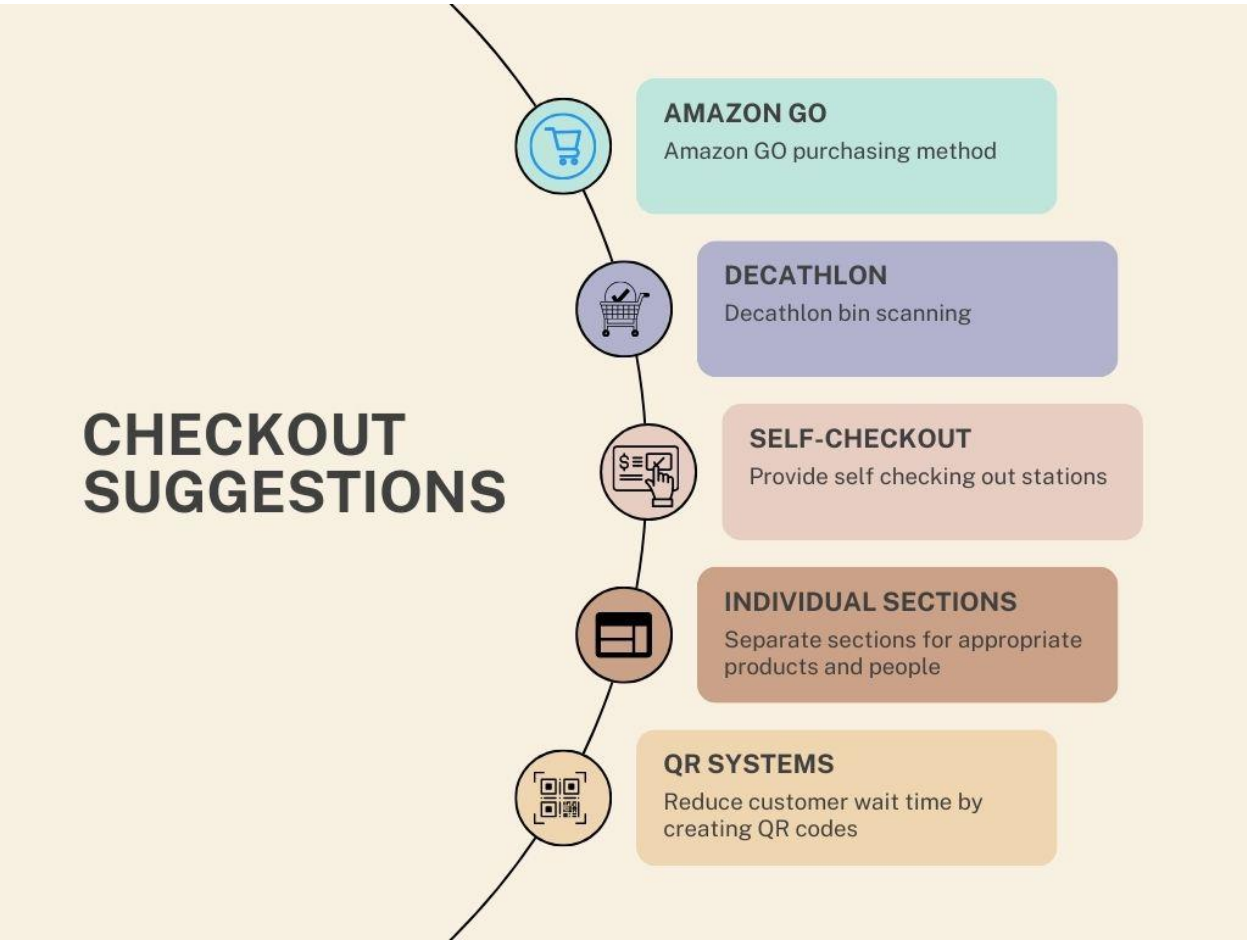

Figure 1: Check out methods

2) Employee count:

Make employees work overtime because they probably have a black Friday holiday. You should adopt a more employee-friendly approach instead of mandating employee overtime on Black Friday due to increased customer demand. Offer voluntary overtime shifts with incentives such as additional pay or bonuses to motivate staff. Ensure that employees receive adequate breaks and consider shift rotations to prevent burnout.

3) Online

To manage the customers during festival time, I recommend people to do online shopping by providing an additional discount in the form of a coupon. Provide more offers for online purchases and make some products offered online only, so this will save you from getting more people visiting your store on sale days.

We also suggest you provide in-store pick-up and Curbside pickup from online purchases not on sale days so that you can give good in-store customer service on Black Friday and make it available for those who ordered online for in-store pickup the next day. This will greatly reduce employee pressure and make a smooth checkout process.

4) Improvement in Store Management

To enhance the customer experience, try to make the store systematic. Display the item separately according to the choice of different gender. Consider checkout efficiency while designing the store layout. Place checkout lanes near the entrance and exit to save consumers travel time. Ensure checkout lines have enough room for consumers to unload their carts and personnel to complete transactions quickly. It benefits time and provides better store management.

5) Improve Communication and Signage:

Communicate checkout instructions and queue management through informative signage, ensuring customers know available options and processes. Make visual posters and signs which navigate people to their specific aisle and avoid confusion. This is most common in all stores, and you also follow this, but this needs to be consistent by periodically checking with new customers how they deal with this strategy.

6) Regular Performance Monitoring:

Continuously monitor checkout performance and customer feedback to identify areas for ongoing improvement and make real-time adjustments. Display a suggestion link on the checkout region as a QR code and ask people to provide feedback on what they feel needs to be installed on-site.

By implementing these solutions and aligning with ISO 9001 standards, Sport Chek can significantly enhance the customer checkout experience on Black Friday, reducing waiting times and improving overall customer satisfaction. Visual aids like flowcharts and diagrams illustrating these changes during the implementation plan can effectively communicate the improvements to stakeholders and staff.

7) Incorporate Visual Aids and Graphics:

Create visual aids such as flowcharts, diagrams, or process maps to visually represent the current checkout process, highlight the identified gaps, and illustrate how the proposed solutions will address these gaps effectively.

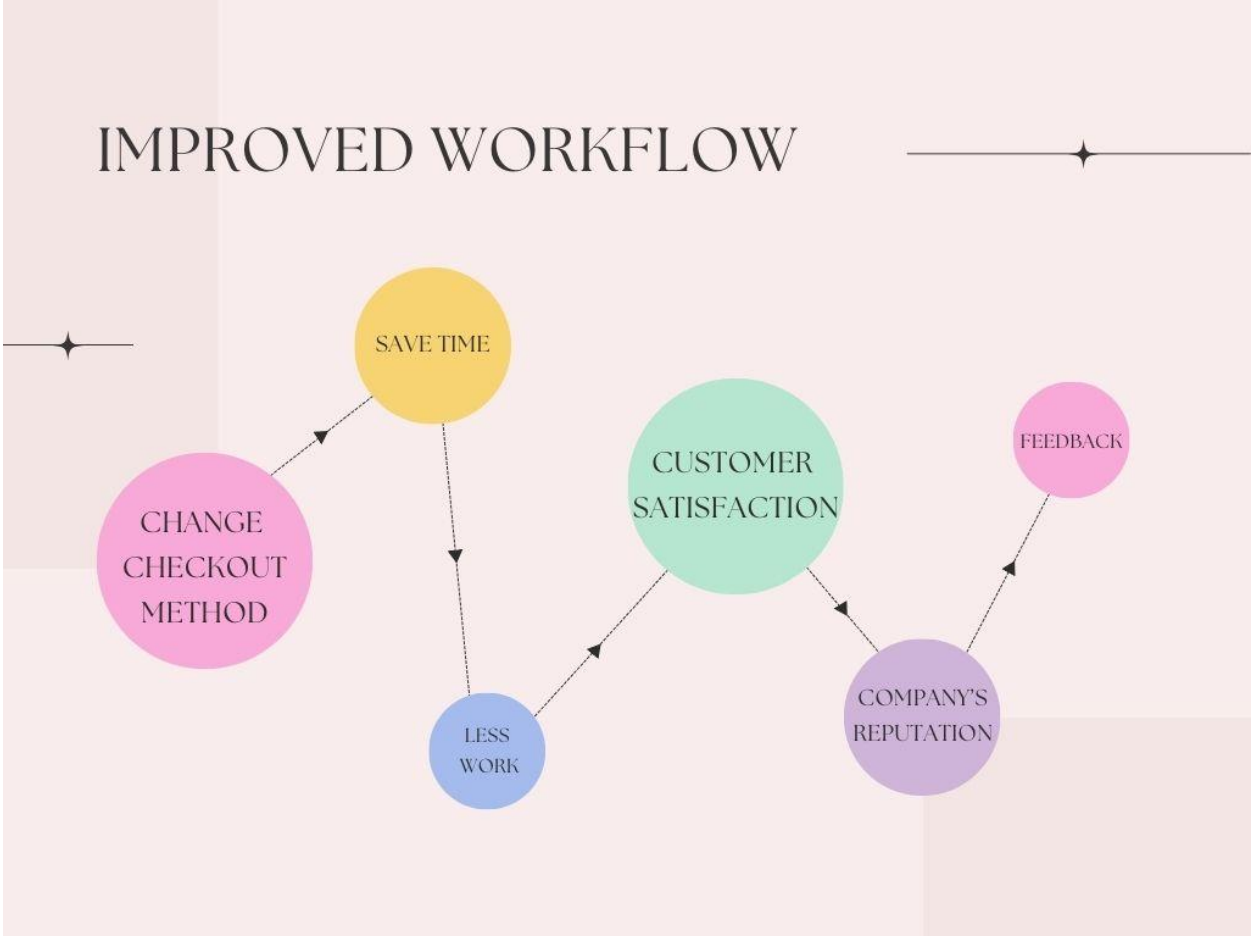

Figure 2; Improvement flowchart

So, these are the GAP solutions we developed to ensure better outcomes.

OUR WORK ON WEEK 3

PROBLEM STATEMENT

There has been a series of complaints about the cleanliness of our mall's restrooms; this will create a problem in our relationship with our tenants who own famous restaurants in our mall.

TARGET

To maintain better relationships with the tenants and improve the mall's restroom management.

Here, we used SPC and Control Charts.

STATISTICAL PROCESS CONTROL (SPC):

Statistical Process Control (SPC) is a methodology that employs statistical techniques to monitor, control, and improve processes to enhance their efficiency, consistency, and quality. SPC uses statistical tools and methods to analyze data collected from a process and make informed decisions about process performance. The key objective of SPC is to distinguish between common cause variation (inherent to the process) and unique cause variation (resulting from specific, identifiable factors). By understanding and controlling these variations, organizations can achieve more predictable and reliable outcomes, reduce defects, optimize processes, and ultimately deliver products or services that meet or exceed customer expectations. SPC empowers organizations to proactively manage and enhance processes to ensure continuous improvement and high-quality results.

CONTROL CHART:

A control chart is a statistical tool used in quality management and statistical process control (SPC) to monitor and analyze processes over time. It visually displays data points collected from a process, allowing for the detection of patterns, trends, and variations indicative of unique or common causes affecting the process. It typically consists of a central line representing the process mean and upper and lower control limits, calculated based on the process's historical data. Control charts help organizations distinguish between natural variability inherent in a circle and variations caused by external or assignable factors. They enable the timely identification of deviations from desired performance and aid in making data-driven decisions for process improvement and maintenance of quality standards.

SPC PROCESS:

Identifying Key Quality Characteristics:

1. Consistent Cleaning
2. Materials That Resist Odor
3. Powered air fresheners
4. Effective Waste Management
5. Paper Towels and Hand Dryers
6. Repair leaks and maintain plumbing
7. Train Staff
8. adding odour absorber
9. Continual Inspecting
10. Professional Cleaning Services

DATA COLLECTION

We collected data by checklist; we planned to create a poll with customers daily at appropriate times to collect data regarding the cleanliness of our mall washrooms to plot a graph. So, we placed a box in the middle of the food court region of our mall so that customers could answer whether the washrooms were good enough. The main terms asked in the poll are Odor, Papers and Tissues, Washbasins, Floors and mirrors, Accessibility and child holding, Garbage disposals, Temperature, Sanitizers and Soap and Dryers' abilities.

Checklist	Supervisor:						
Tasks	MON	TUE	WED	THU	FRI	SAT	SUN
PRE-OPENING /MID-MORNING/ POST LUNCH/ CLOSING							
Washbasins							
Sinks							
Mirrors							
Doors							
Floor							
Papers filled							
Soap dispenser							
Hand sanitizer							
Fragrance							
Temperature							
Hand dryer							
Ventilation							
Waste disposal							

Table 1: Work order checklist

Control chart:

A control chart is a tool in SPC; it is a graph used to study how a process changes over a particular time. Data are plotted over time with an average line and upper and lower control limit. These control limit lines are gathered from previous data to compare with current data to find improvements. This procedure is followed to find changes and derive conclusions from our process improvement techniques.

DAYS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Washroom Odor	26	22	17	16	22	17	19
Papers and Tissues	18	14	20	15	13	20	15
Washbasins	5	5	6	9	7	8	2
Floors and mirrors	19	13	30	14	27	10	19
Accessibility and child holding	9	9	11	5	6	11	9
Garbage disposals	22	30	28	18	16	18	16
Temperature	10	8	7	9	4	2	8
Sanitizers and Soap	12	7	7	8	5	8	3
Dryers	9	7	4	17	5	10	13

Figure 3: People's feedback

X BAR	X BAR BAR	X MAX	X MIN	X BAR BAR + 1 SIGM	X BAR BAR + 2 SIGM	X BAR BAR + 3 SIGM	R	R BAR	SIGMA	UCL	LCL
19.857	12.683	26	16	16.545	20.408	24.270	10	10.444	3.863	16.892	8.473
16.429	12.683	20	13	16.545	20.408	24.270	7	10.444	3.863	16.892	8.473
6.000	12.683	9	2	16.545	20.408	24.270	7	10.444	3.863	16.892	8.473
18.857	12.683	30	10	16.545	20.408	24.270	20	10.444	3.863	16.892	8.473
8.571	12.683	11	5	16.545	20.408	24.270	6	10.444	3.863	16.892	8.473
21.143	12.683	30	16	16.545	20.408	24.270	14	10.444	3.863	16.892	8.473
6.857	12.683	10	2	16.545	20.408	24.270	8	10.444	3.863	16.892	8.473
7.143	12.683	12	3	16.545	20.408	24.270	9	10.444	3.863	16.892	8.473
9.286	12.683	17	4	16.545	20.408	24.270	13	10.444	3.863	16.892	8.473

Figure 4: Before changes

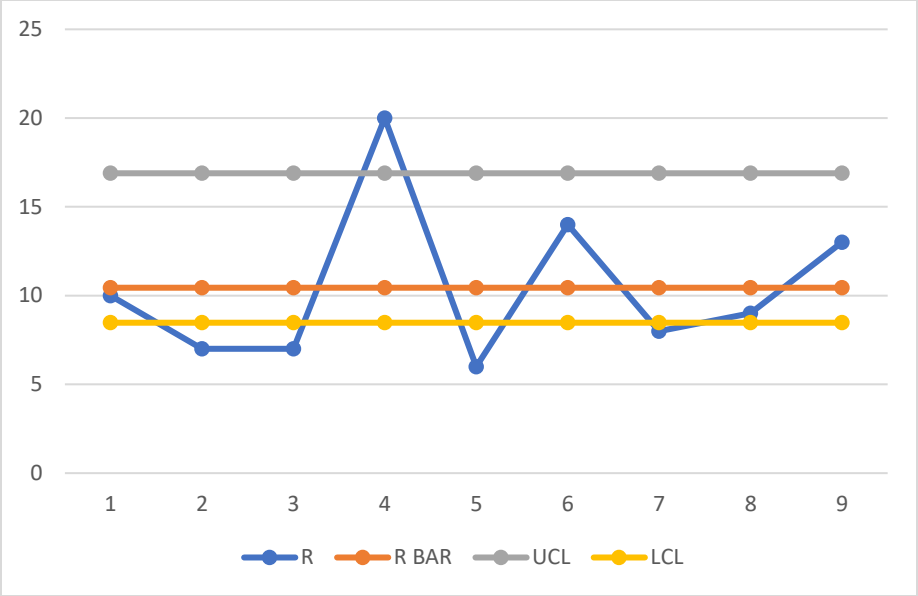

Figure 5: Range variation before change

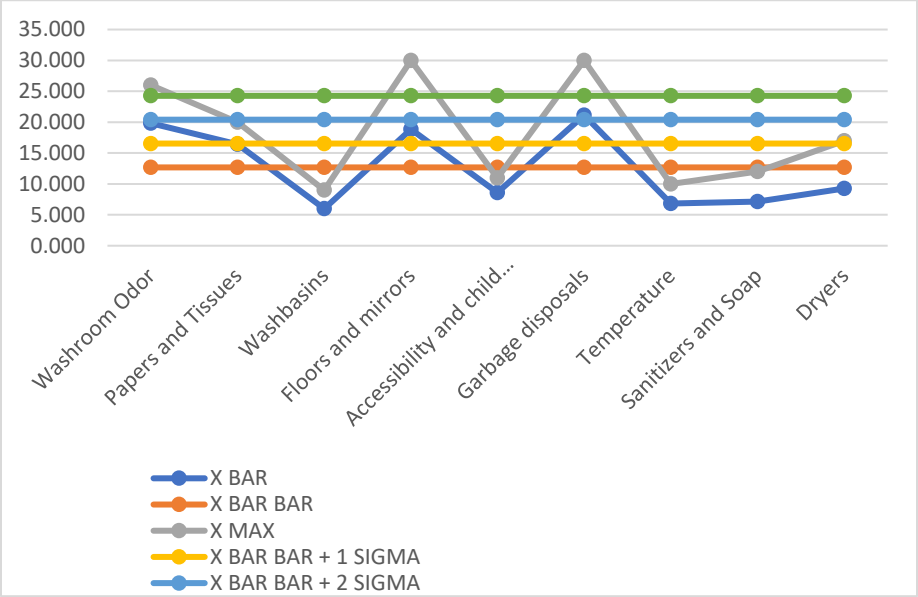

Figure 6: Sigma variation before changes

In Figure 1 the range is higher than the UCL, and in Figure 2 the X BAR BAR is higher than the 3rd sigma level.

From the data we collected in the second week after the corrective actions taken, we can see the average value of our deviation remained less than the expected Upper Control Limit of our distribution of the previous graph (before control measures),

DAYS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Washroom Odor	12	7	8	10	6	7	8
Papers and Tissues	10	9	8	7	7	8	9
Washbasins	4	7	4	9	5	6	2
Floors and mirrors	9	11	15	12	15	9	15
Accessibility and child holding	9	7	5	5	2	5	5
Garbage disposals	15	12	15	12	11	11	10
Temperature	6	5	4	4	4	2	5
Sanitizers and Soap	9	5	5	4	3	5	3
Dryers	5	2	5	9	5	2	7

Figure 7: People's feedback

X BAR	X BAR BAR	X MAX	X MIN	X BAR BAR + 1 SIGMA	X BAR BAR + 2 SIGMA	X BAR BAR + 3 SIGMA	R	R BAR	SIGMA	UCL	LCL
8.286	7.333	12	6	9.429	11.525	13.620	6	5.667	2.096	9.617	5.050
8.286	7.333	10	7	9.429	11.525	13.620	3	5.667	2.096	9.617	5.050
5.286	7.333	9	2	9.429	11.525	13.620	7	5.667	2.096	9.617	5.050
12.286	7.333	15	9	9.429	11.525	13.620	6	5.667	2.096	9.617	5.050
5.429	7.333	9	2	9.429	11.525	13.620	7	5.667	2.096	9.617	5.050
12.286	7.333	15	10	9.429	11.525	13.620	5	5.667	2.096	9.617	5.050
4.286	7.333	6	2	9.429	11.525	13.620	4	5.667	2.096	9.617	5.050
4.857	7.333	9	3	9.429	11.525	13.620	6	5.667	2.096	9.617	5.050
5.000	7.333	9	2	9.429	11.525	13.620	7	5.667	2.096	9.617	5.050

Figure 8: After changes

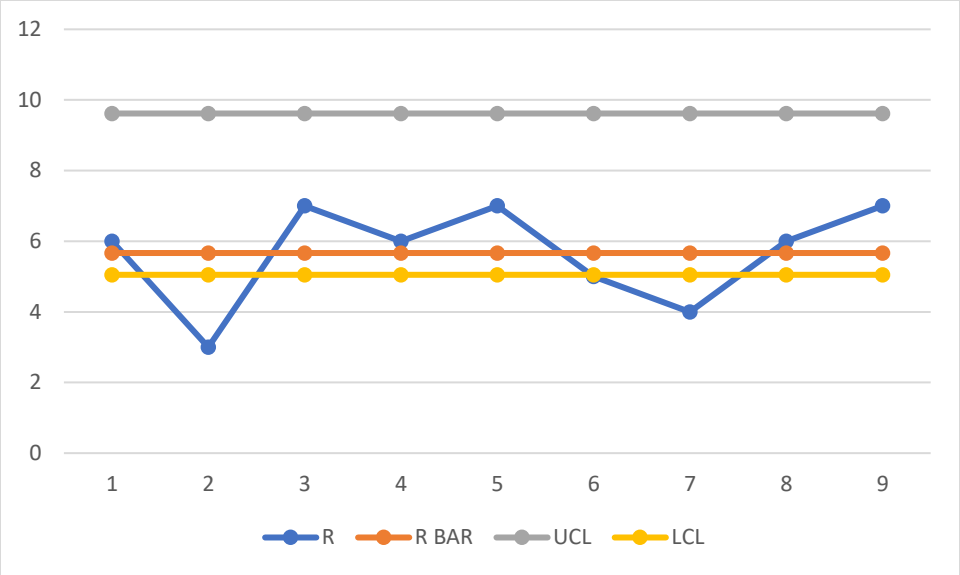

Figure 9: Range variation after changes

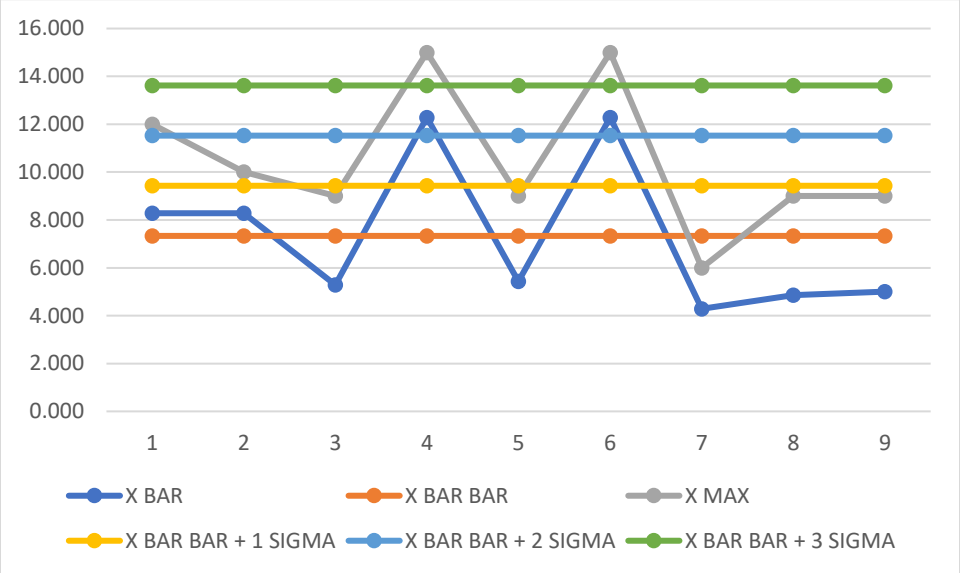

Figure 10: Sigma variation after changes

In Figure 3 the range is lower than the UCL, and in Figure 4 the X BAR BAR is lower than the 3rd sigma level.

Analyzing deviations:

Here, in the first week, we analyzed the main deviations from the Upper Control Limits; this means the complaints exceeded the expected value of our distribution. With the data we collected in the first week, we found the main problems and worked to reduce the complaints.

Corrective Action:

This problem can be checked using Control charts, and this tool helps implement SPC correctly. We took some corrective actions with respect to the problems we faced regarding these issues. Washbasin problems are water clogging and water leakage and fixing this issue with regular plumber inspection every month.

Documentation:

We hope this problem is solved with our new strategy, but this still needs to be checked and monitored for future problem prevention.

OUTCOMES:

From the previous work, we suggested some solutions and got better results after applying them. Overall, from evaluating from week to week, we observed that there are reduced amounts of customer complaints. More customer satisfaction has been obtained during the last week, indicating that our corrective actions are working.

OUR WORK ON WEEK 4

PROBLEM STATEMENT

There is going to be a new Retail store opened in our mall named Maple Mart.

TARGET

We need to check whether their products are following PPAP.

WHAT IS PPAP

The Production Part Approval Process (PPAP) is a structured and standardized approach used within the manufacturing and supply chain industries to validate and ensure that component suppliers and their production processes meet the specific quality requirements set by the customer. It consists of 18 crucial elements, each designed to thoroughly assess and confirm the quality and reliability of the produced parts (Quality one, 2023).

HOW IT IS PRACTICED

PPAP is practiced at various stages in the product life cycle. It is a meticulous process during new part submissions or when changes to existing parts or functions are introduced. Additionally, customers may request a PPAP at any time during the product's life cycle to ensure continued adherence to quality standards. The PPAP process involves a detailed review of design documentation, process flow diagrams, failure mode analysis, control plans, and other essential elements to guarantee part quality and compliance with customer requirements.

WHY IT IS NEEDED FOR US

We are taking milk production, processing, and retailing for our project in this mart. Milk is an essential stock in every retail store and a vital food item most people consume. So, we decided to check the processing and retailing of milk in this mall. We will review the 18 steps of PPAP, but PPAP still needs to be done completely by our side because the DFMEA and Process flow chart have been gathered from them. All the processes they are doing are cross-checked with the Ontario Food Department. By doing this, we can determine the value of the retail store.

PPAP STEPS

1. DESIGN DOCUMENTATION

Design documentation must encompass duplicates of the customer's and supplier's blueprints. Additionally, it should incorporate a replica of the purchase order. In certain instances, the supplier must furnish documentation regarding material composition.

The purchase order affirms that the accurate part is being requested and that it aligns with the correct revision level. The responsibility of confirming the alignment of the two drawings and identifying all critical or key characteristics lies with the design engineer.

Details about material composition are necessary to prove that the materials utilized in manufacturing the parts comply with the precise requirements outlined by the customer. (Quality one, 2023)

Here, store employees only process the milk orders when needed; over-stocking leads to milk wastage. The milk products must incorporate the Ontario food and safety law and be processed according to requirements.

2. ENGINEERING CHANGE DOCUMENTATION

For PPAP requests prompted by a modification to a part or product, the package must incorporate the pertinent documentation for initiating and endorsing the change. Typically, this involves including a duplicate of the Engineering Change Notice (ECN), a document that necessitates approval from the customer engineering department (Quality one, 2023).

3. CUSTOMER *ENGINEERING APPROVAL*

When mandated as a component of the PPAP process, the supplier must furnish proof of endorsement from the customer's engineering department.

If necessary, the customer may request pre-PPAP samples for on-site evaluation. These samples must accurately represent production specifications and be shipped with a waiver, facilitating the testing process. Upon testing completion, the test engineers' approval form will be provided for inclusion in the PPAP submission. We must ensure they provide pre-PPAP samples for customers if asked.

We must be aware that presenting a copy of a "temporary deviation" is a prerequisite for submitting parts to the customer before obtaining formal PPAP approval (Quality one, 2023).

4. DFMEA (DESIGN FAILURE MODE AND EFFECTS ANALYSIS)

Design Failure Mode and Effects Analysis (DFMEA) is a collaborative process that assesses design-related risks by analyzing potential failure modes, their impact on the product or customer, and their likelihood of occurrence. Failure modes encompass various aspects such as product malfunctions, diminished performance or product lifespan, and safety and regulatory concerns. The DFMEA is a dynamic document requiring regular review and updating throughout the product's life cycle.

From our point of view, DFMEA can’t be researched; the milk production and processing designs are inbounded, and from that, only a process flow chart is created. So, we decided to check this project's Process Failure Mode and Effect Analysis (PFMEA). Also, this DFMEA is well suited for automobile industries to check on PPAP from our side (Quality one, 2023).

5. PROCESS FLOW DIAGRAM

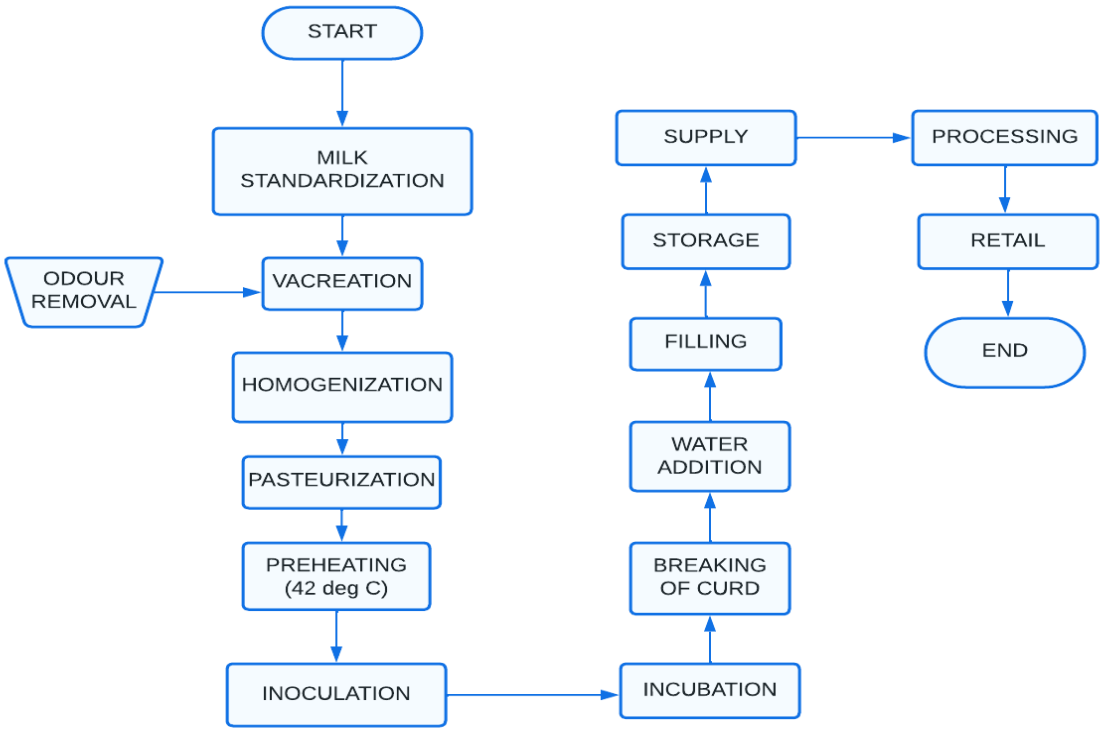

Figure 11: Milk production flow chart

6. PFMEA (PROCESS FAILURE MODE AND EFFECTS ANALYSIS)

Process Failure Mode and Effects Analysis (PFMEA) is a systematic methodology to identify potential risks associated with process modifications. The PFMEA initiates by pinpointing process functions and the possible failure modes, considering their impacts on the process. The effect on the end user is felt if there are design inputs or unique characteristics. Each failure mode's severity ranking, indicating the danger associated with its development, is then determined. Following this, causes and their mechanisms for the failure mode are identified, assuming that the design is satisfactory and keeping the focus on the process. In the case of a high probability of a cause, actions are undertaken to prevent or mitigate its impact on the failure mode. The detection ranking assesses the effectiveness of specific tests in confirming the elimination of failure modes or causes. The PFMEA monitors progress by tracking Risk Priority Number (RPN) reductions. A comparison of RPN values before and after improvements provides a historical record of enhancements and risk mitigation efforts. (Quality One , 2023)

For our research, the PFMEA table is as follows. This PFMEA table also contains the corrective action methods.

7. CONTROL PLAN

The Control Plan is a comprehensive document outlining the necessary steps, such as measurements, inspections, quality checks, or monitoring of process parameters, at each process stage. Its primary goal is to ensure that the process outputs meet predetermined requirements. The Control Plan equips operators or inspectors with essential information to effectively manage the process and produce high-quality parts or assemblies. It should also provide guidance on the actions to be taken if a deviation from the established standards is detected. It's important to note that the Control Plan doesn't replace detailed operator instructions but works in tandem with them. Sometimes, it may be used alongside an inspection sheet or checklist. The Control Plan plays a crucial role in maintaining quality standards, particularly in scenarios of employee turnover, by setting a consistent standard for quality inspection and process monitoring. These plans are dynamic documents that require periodic updates to reflect improvements in measurement methods and controls throughout the product's life cycle (Quality One, 2023).

Here, the control plan process is considered the High RPN we have in this PFMEA; the threshold value we fixed here is 100. So, we are determined to work on strategies whose RPN is over 100 to reduce the risk of failure.

FAILURE MODE AND EFFECTS ANALYSIS

Item:	MILK	Responsibility:	SUPERVISOR	FMEA num	1000
Model:	DAIRY PRODUCT	Prepared by:	MAPLE MART	Page :	1 of 1
Core Team:	QUALITY TEAM OF BAYSIDE MALL			FMEA Date	10/6/2023 Rev: 1

FMEA process number	Process Function	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Potential Cause(s)/ Mechanism(s) of Failure	Occur	Current Process Controls	Detec	RPN	Recommended Action(s)	Responsibility and Target Completion Date	Action Results				
												Actions Taken	Sev	Occ	Det	RPN
1001	Milk standardization	Mis-labelled as different type of milk	Wrong type of milk processed	6	Worker unawarenes	5	Density and texture checkinh	5	150	Better training and detection	Supervisor (10/12/2023)	Monitoring hygienic practices	6	3	4	72
1101	Production equipment (vacreation to Pasteurization)	Physical contamination	Contamination	7	Operatior not wearing gloves	1	Visual detection	2	14							0
1102		Chemical contamination	Contamination	8	Having impurites in machine	1	Visual detection	2	16							0
1201	Preheating	Overheated	Milk becomes thick/ un-useable	6	Not maintaining correct temperature	4	Temperature detection sensor	3	72	Maintaining appropriate temperature	Production manager (10/10/2023)	Monitoring on preheating temperature	6	3	2	36
1301	Addition of water	Over water added	Milk becomes too watery	8	Not ensuring volume of water added	2	Density finder	5	80	Measuring density	Production manager (10/10/2023)	Changed the density measuring equipment	8	2	3	48
1302		Less water addition	Milk remains too thick	4	Not ensuring volume of water added	2	Density finder	4	32							0
1303		Biological Contamination	Milk becomes un-useable	6	Impure water addition	2	Manual detection	1	12							0
1401	Filling	Censor failure	Inadequate milk filled	3	Uncalibrated censor	2	Automatic rejector by the censor	3	18							0
1402		The seal is not tight	Channeling	7	Foamy product	1	Manual detection	2	14							0
1403		Folded foil	Wrinkled foil	7	Improper foil rools	1	Manual detection	3	21							0
1404		Microbiological contamination	Milk contamination	7	Unhygienic wraps (of packaging material)	1	Manual detection	2	14							0
1501	Labelling	Improper label	Wrong product sold	4	Improper handleing	4	Manual detection	4	64							0
1601	Storage	Stored in higher temperature	Milk contamination	8	Temperature sensor failure	5	Manual detection	4	160	Better cooling method	Store supervisor (10/15/2023)	Monitoring tempertaure regularly	8	3	3	72

Figure 12: PFMEA

(M & Galuh Paramitha, 07/19/2019)

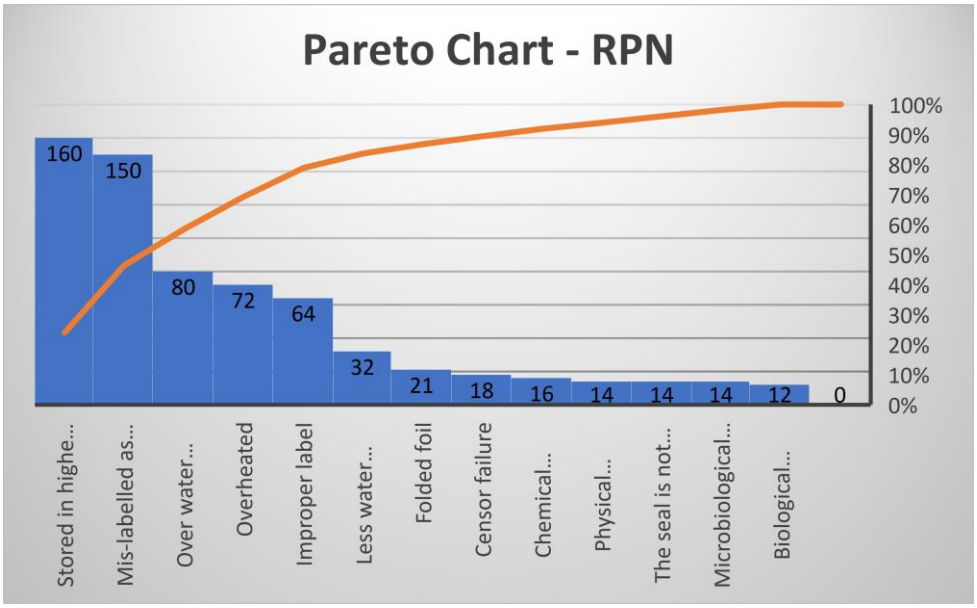

Figure 13: RPN Pareto chart

Figure 14 : RPN

We attached the Excel file with this report to clear view,

- The first problem we took on was labelling different types of milk; this happens at the pre-processing stage, where the variety of cow milk is wrongly categorized as other. This will lead to the processing and packaging of the wrong milk products. So, we created a control plan to rectify the issue. We asked the production manager to manage better the detection and training of categorization of milk varieties. So that we could reduce the RPN from 150 to 72.
- The second one we have here is the pre-heating problem. Overheating is becoming a significant problem. This gives a high RPN, so we requested the production manager to monitor the temperature using a better temperature sensor. So, we can reduce the RPN from 72 to 36. This is under our threshold, but we are considering all significant problems with high RPN for better quality delivery.
- Next, the addition of water becomes a major issue, which is also dealt with in the Control plan.
- The last one is the storage problem; after every processing is done when the milk products reach the retail store, they need a better location to store and make it available for customers, but refrigeration is mandatory. In most cases, the milk becomes un-usable when

the refrigeration is not good. So, we asked the store manager to look for better refrigeration of milk products so that our method would reduce the RPN from 160 to 72.

8. MEASUREMENT SYSTEM ANALYSIS

Conducting Measurement System Analysis (MSA) for milk involves defining the purpose, selecting appropriate measurement methods, and gathering data from diverse milk samples. Repeatability and reproducibility studies assess variations within and between operators and instruments. Statistical analysis, like ANOVA and Gauge R&R studies, helps interpret results, indicating if the measurement system needs improvement. Continuous monitoring, equipment calibration, and thorough documentation are essential for ensuring accurate and reliable milk quality and quantity measurements.

9. DIMENSIONAL RESULTS

Milk can be weighed and quantified in kilograms or pounds, with its density given in kilograms per cubic meter or pounds per square foot. Percentage figures are used to indicate specific components like fat and protein levels. Important metrics include pH level, which ranges from 0 to 14, and temperature, which is expressed in °C or °F. Additionally, the specific gravity of milk, a dimensionless ratio comparing its density to that of water, provides information on its makeup. Milk's production, processing, and quality control depend on these measures to ensure compliance with safety and legal requirements.

10. RECORDS OF MATERIALS

For quality assurance and compliance, keeping records during milk production is essential. The information about the supplier, the amount and quality testing of the incoming raw milk, the storage conditions, inventory control, the manufacturing procedures, the waste tracking, the cleaning schedules, and the compliance documents are all crucial data. Accurate records provide traceability, assist in decision-making, and guarantee adherence to safety standards, enabling effective manufacturing and prompt reaction to quality problems or recalls.

11. INITIAL PROCESS STUDIES

A systematic strategy is essential for the early process studies of milk production. This entails outlining every manufacturing process step, gathering thorough data on variables like temperature and quality, and using root cause analysis to find inefficiencies. Prioritizing problems using statistical analysis techniques enables targeted optimizations like modifying equipment settings and perfecting pasteurization procedures. Key actions include:

- Putting quality control systems in place.
- Keeping an eye on things constantly.
- Educating people.
- Making sure safety requirements are being followed.

These efforts make milk production more efficient, with uniform product quality and laws being followed.

12. QUALIFIED LABORATORY DOCUMENTATION

Careful paperwork is necessary to set up a certified milk analysis laboratory. Detailed Standard Operating Procedures (SOPs) for analysis techniques, equipment calibration and maintenance records, and quality control information are all included in this. It is crucial to have accurate sample tracing, thorough test result documentation, and records of employee training. The accuracy, regulatory compliance, and dependability of milk analysis methods are further ensured by keeping safety protocols, compliance records, and records of continuous development.

13. APPEARANCE APPROVAL REPORT

A supplier creates the Appearance Approval Report (AAR) as part of the Production Part Approval Process (PPAP). It proves that a part's outside appearance satisfies the customer's expectations and demands. Here, the dairy product should be labelled correctly and should provide the right instructions for the product in it.

14. SAMPLE PRODUCTION PARTS

These samples are made and examined in various sectors as part of the Production Part Approval Process (PPAP). Here, sample milk products are tested randomly, ensuring the quality standard is met throughout production. Also, make sure that the milk has the right proportion of water and all the elements which come by the mixed proportion.

15. MASTER SAMPLE

A Master Sample is a typical example of a good or component that has undergone careful examination, testing, and approval by relevant parties, such as producers and customers, Here the sample from the first batch is taken and it will undergo deep inspection to ensure the best quality of the product. The quality of this product is taken as the basic standard for the next batches.

16. CHECKING AIDS

Checking aids are specialized tools, fixtures, or pieces of equipment used in production and quality control to check items quickly and precisely. These tools ensure that the inspection of the milk product throughout the process is accurate, and that the product is uniform in size. Ensure that the temperature sensors are working correctly and that there is no milk contamination by bacteria.

17. CUSTOMER SPECIFIC REQUIREMENTS

Customer-specific requirements (CSR) are extra criteria or requirements that are established and defined by a particular client for a specific good or service. Here, the firm will make sure that the milk product will meet the customer's requirements at all conditions and the reviews of the customer are taken into further improvements if needed.

18. PART SUBMISSION WARRANT

A formal document used in the manufacturing sector is the Part Submission Warrant (PSW). In the Production Part Approval Process (PPAP), it is a vital step. The firm will be prepared and ready for mass production with zero failure. To achieve that the overall quality will be thoroughly maintained by the rate of production, quality of raw materials, equipment used in the production, the whole infrastructure, storage of the milk products and then signing the document.

OUTCOMES

Here, what we gathered on this project is that the Retail store quality can be monitored by their PPAP, so with respect to our resources and time duration, we considered the milk products in the retail store majorly signify the PPAP of the store. From the PFMEA table, we have found some major problems addressed in the control plan.

CONCLUSION

In conclusion, our comprehensive approach to enhancing the customer checkout experience at Sport Chek during Black Friday involved identifying key gaps in time management, bottleneck creation, reputation loss, and employee efficiency. To address these issues, we proposed solutions such as employee-friendly overtime policies, incentivizing online shopping, improving store management, enhancing communication through signage, and implementing regular performance monitoring aligned with ISO 9001 standards.

Implementing these solutions reduces customer waiting times, creates a smoother flow, and ultimately improves overall customer satisfaction. Visual aids, including flowcharts and diagrams, were suggested to communicate the changes to stakeholders and staff effectively.

Moving forward, our focus shifted to addressing restroom cleanliness concerns at Bayside Mall. We systematically analyzed and improved restroom management by employing Statistical Process Control (SPC) and Control Charts, reducing customer complaints and increasing satisfaction.

In the subsequent weeks, our attention turned to the introduction of a new retail store, Maple Mart, at Bayside Mall. We applied for the Production Part Approval Process (PPAP) to ensure the quality and compliance of the store's milk products. We aimed to guarantee a high standard for the retail store's milk products by meticulously evaluating the 18 PPAP elements, including design documentation, engineering change documentation, customer engineering approval, and various process analyses.

Our journey involved problem-solving, strategy implementation, and continuous improvement, emphasizing the importance of quality management systems, customer satisfaction, and adherence to industry standards. These efforts collectively contribute to the overall excellence of Bayside Mall as a premier shopping destination.

REFERENCES

M, D., & Galuh Paramitha, R. (07/19/2019). Factors Influencing Product Quality in Milk Processing. *Factors Influencing Product Quality in Milk Processing*, 103.

Ministry of Agriculture, Food and Rural Affairs. (2023, 10 05). *Pasteurized milk in Ontario*. Retrieved from Ontario.ca: https://www.ontario.ca/page/pasteurized-milk-ontario#:~:text=and%20your%20family.-,What%20is%20pasteurization%3F,a%20set%20period%20of%20time.

Quality One . (2023, 10 05). *Process FMEA (PFMEA)*. Retrieved from Quality One : https://quality-one.com/pfmea/

Quality One. (2023, 10 05). *Control Plan Development*. Retrieved from Quality One: https://quality-one.com/control-plan/

Quality one. (2023, 10 05). *Production Part Approval Process (PPAP)*. Retrieved from Quality One: https://quality-one.com/ppap/

Rachmadhani, M. D. (07/19/2019). Factors Influencing Product Quality in Milk Processing. *Factors Influencing Product Quality in Milk Processing*, 8.

Safety Culture. (2023, 10 05). *What is PPAP and How to Perform it Effectively*. Retrieved from Safety Culture: https://safetyculture.com/topics/ppap/