A REVIEW STUDY ON VARIOUS SAMPLING PLANS

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ABSTRACT

This article delves into the dynamic intersection of Statistical Quality Control (SQC) methodologies and the intricate realm of sampling plans to optimize quality assurance strategies across diverse industries. Sampling plans play a pivotal role in assessing product and process quality, and their efficacy is inherently linked to the precision and reliability of underlying statistical analyses. The objectives of this study are multifaceted, aiming to evaluate and refine the applications of SQC in various types of sampling plans, including attribute and variable sampling, as well as acceptance sampling plans. Through an extensive literature review, we explore the nuanced landscape of SQC techniques and statistical product control, tailored to the unique demands of diverse sampling methodologies. Drawing on real-world examples and case studies, this article demonstrates how the integration of SQC techniques augments decision-making processes within the sampling framework. In conclusion, our findings underscore the transformative potential of innovative SQC applications in sampling plans. Practical recommendations for industry practitioners guide the seamless integration of these methodologies into existing quality assurance frameworks. As we chart new territories in quality control, this article sets the stage for future investigations, identifying avenues for continuous improvement and exploration in this evolving field.

Keywords: Statistical Quality Control, sampling Inspection Plans, SQC, SSP, and DSP.

I. Introduction

In the realm of contemporary industries, the pursuit of quality control stands as a linchpin in ensuring the reliability, consistency, and excellence of products and services. Whether in the intricate machinery of manufacturing or the nuanced landscapes of service industries, the imperative to maintain and enhance quality remains paramount. The bedrock of this endeavor lies in the systematic application of quality control methodologies, and one integral facet of this paradigm is the strategic implementation of sampling plans. Quality control, as a discipline, has evolved from a bare inspection process to a comprehensive system that ensures conformity to predefined standards, thereby mitigating defects and enhancing customer satisfaction. In the dynamic tapestry of industries, the importance of quality control cannot be overstated, influences market competitiveness, brand reputation, and the overall viability of enterprises. This article embarks on an exploration of the symbiotic relationship between quality control and sampling plans, delving into their interconnected roles and significance. Through a nuanced examination, we aim to decipher how the integration of statistical methodologies can fortify the foundations of sampling plans, subsequently contributing to the overarching objective of unparalleled quality assurance. By dissecting this multifaceted landscape, we seek to uncover insights that transcend industries, providing a roadmap for the strategic amalgamation of these critical elements in the pursuit of superior quality control.

II. Objectives Of The Study

The primary objectives of this article are to:

- **Evaluate Effectiveness:** Assess and measure the effectiveness of statistical quality control (SQC) methodologies within the context of various sampling plans.
- **Identify Strengths and Weaknesses:** Identify the strengths and weaknesses of SQC applications in different types of sampling plans, shedding light on areas of optimization and potential improvement.
- **Enhance Decision-Making:** Investigate how the integration of statistical quality control contributes to informed decision-making processes within sampling, ultimately influencing the overall quality assurance strategy.
- **Recommend Best Practices:** Provide clear recommendations for best practices in utilizing statistical quality control for enhancing the

efficiency and reliability of diverse sampling plans.

III. Methodology

Designing Effective Sampling Plans in Statistical Quality Control

The methodology section serves as a blueprint for the comprehensive investigation into the design of sampling plans within the realm of statistical quality control. This segment outlines the systematic steps taken to ensure a robust research process, covering the selection of industries and products, the definition of acceptance criteria, and the identification and application of statistical quality control techniques.

3.1 Sampling Plan Design: Crafting Strategies for Single and Double Sampling Plans: This article meticulously explores the design process for single and double sampling plans, central to statistical quality control. It unveils decision-making intricacies, elucidating sample size, acceptance numbers, and rejection criteria choices within industry standards. Considerations for inherent product variability are pivotal for these plans' efficacy, enhancing their alignment with industry practices.

3.1.1 Designing Single Sampling Plans (SSP): Crafting a single sampling plan begins with selecting an optimal sample size, balancing representation, and practical constraints like cost and time. Acceptance numbers, pivotal in batch decisions, undergo careful selection to manage risk levels effectively. Simultaneously, rejection criteria maintain production efficiency. Alignment with industry standards ensures statistical robustness and seamless integration into quality control frameworks.

3.1.2 Designing Double Sampling Plans (DSP): Double sampling plans require careful decision-making, especially regarding initial sample selection, balancing early defect detection with resource efficiency. Acceptance numbers and rejection criteria in the second sample are intricately linked to initial inspection findings, highlighting the dynamic nature of these plans for adaptability. They excel in scenarios prioritizing early defect detection, aligning theoretical robustness with practical viability akin to single sampling plans and industry standards.

3.2. Real-Life Example of Single Sampling Plan for OC Curve:

The goal is to visualize the probability of accepting a lot based on a single-sampling plan. In this scenario, the lot is accepted if there is at most one nonconforming item in the sample.

Parameters: Probability of faulty Item (p - nonconforming): Given in the problem as 0.5 percent or .005.

- Total Number of Items in the Lot (n-total): 60 items.

- Sample Size (sample size): Determined based on the inspection process; here, the sample size is 10 items.

a) Define the Range of Sample Sizes:

Choose a range of sample sizes. For simplicity, consider a range from 1 to the total number of items in the lot.

b) Calculate the Probability of Acceptance for Each Sample Size:

- For each sample size, calculate the probability of accepting the lot. Use the binomial cumulative distribution function (CDF) with the condition that at most one item is nonconforming in the sample.
- The formula for binomial CDF is P(X <= k) where X follows a binomial distribution.

c) Plotting the OC Curve:

- Use a graphing tool or software (such as Matplotlib in Python) to plot the OC curve.
- The x-axis represents the sample size, and the y-axis represents the probability of acceptance.

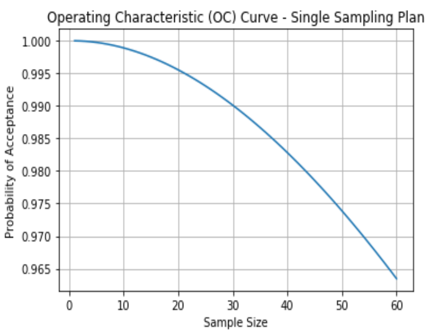

Fig 1: OC curve –single sampling Plan.

d) Interpretation:

- Examine the resulting Fig 1 curve. It shows how the probability of accepting the lot changes with different sample sizes.
- In a single-sampling plan, a sample size that provides an acceptable level of risk for nonconforming items.

IV. Result and Discussions

4.1. Single Sampling plan:

The conclusion of “A Procedure for the Selection of Single Sampling Plans by Variables Based on Pareto Distribution” (2013) by Geetha Sathya Narayanan and Vijayaraghavan Rajarathinam [11] addresses the inherent limitations of assuming normality in quality characteristic distributions for sampling plans by variables. The formulation and evaluation of a single sampling plan for Pareto-distributed quality characteristics demonstrate a practical approach to real-world scenarios. By leveraging the approximation of normal distribution for linear combinations of independent variables, even in the presence of departures from normality, the authors provide a robust methodology. This work contributes significantly to the field by offering a tailored solution for sampling plans in the presence of non-normally distributed quality characteristics, enhancing the applicability of such plans in diverse industrial settings.

Mujahida Sayyed's [13] study on variable sampling plan for correlated data (2016) the mean with a known coefficient of variation (CV) offers practical insights into quality control strategies. The example of a single sampling plan illustrates the methodology's application, considering parameters such as significance levels and acceptance numbers. The calculated operating characteristic (OC) values, particularly in the context of correlated data, reveal a notable sensitivity to increases in the coefficient of variation. The observed impact of correlation on both producer's and consumers' risk underscores the importance of minimizing the correlation between observations. The recommendation to maintain low correlation aligns with the overarching goal of safeguarding both producers and consumers in quality control practices. Overall, Sayyed's work provides valuable guidance for quality control practitioners aiming to enhance inspection processes and mitigate risks associated with correlated data.

The authors, R. Vijayaraghavan and A. Pavithra [20] provide a groundbreaking conclusion in their paper on the "Selection of Single Sampling Plans by Variables Based on Generalized Beta Distribution (2022)." By addressing the limitations of assuming normality in quality control, the authors introduce procedures tailored for a generalized beta distribution. Their innovative approach not only caters to industrial practitioners' concerns about distributional assumptions but also offers applicable solutions for bulk inspection procedures, particularly when quality characteristics involve compositional proportions. This contribution signifies a significant step forward in statistical quality control methodologies.

4.2. Double Sampling plans:

In "Tablet Acceptance by a Double Sampling Plan (1964)," authors R. A. Grundman and Bernard Ecanow [1] focus on analyzing the performance characteristics of a given double sampling plan for tablet acceptance. Focusing on its handling of varying quality across tablet batches, approved tablet quality, and average inspection requirements. Their study offers insights into tablet acceptance intricacies, emphasizing the need to scrutinize the plan thoroughly. The research highlights the significance of systematically evaluating and refining inspection plans in pharmaceutical manufacturing, aiding informed decision-making processes.

In "Systems of Double Sampling Plans for Fixed Sample Sizes" (1985), Anup Majumdar [3] addresses the challenges posed by fixed sample sizes in double sampling plans, driven by economic, administrative, or practical constraints. The paper focuses on determining decision parameters that minimize the sum of the producer's risk and the consumer's risk in such situations. This research not only offers practical solutions for real-world applications but also emphasizes the significance of tailored approaches in designing robust sampling plans under specific constraints. Majumdar's contributions stand as a relevant resource for professionals engaged in quality control and decision-making processes.

In "The Operating Characteristic of Double Sampling Plans by Variables When the Standard Deviation is Unknown (2006)," Wolf Krumbholz and Andreas Rohr [5] tackle the challenge of one-sided specification limits in double sampling plans for normally distributed quality characteristics with an unknown standard deviation. The paper introduces a practical algorithm for calculating the Operating Characteristic (OC) of sampling plans proposed by Bowker and Goode (1952). The authors provide illustrative examples, demonstrating the algorithm's effectiveness. Moreover, the study extends the algorithm's applicability to compute the OC of the double-stage t-test, showcasing its versatility in various statistical scenarios. Krumbholz and Rohr's work not only addresses a specific problem in quality control but also contributes a methodologically sound algorithm with broader applications, reinforcing its relevance in statistical analysis.

In "Construction of Double Sampling Plans through Six Sigma Quality Levels (2009)," authored by R. Radhakrishnan and P.K. Sivakumaran [8], the paper introduces a novel procedure for engineers to select Double Sampling Plans through Six Sigma Quality Levels 1 (pss1) and 2 (pss2) separately. The plans presented in this study offer a more effective alternative to classical plans indexed through Acceptance Quality Limit (AQL) and Limiting Quality Level (LQL). Specifically designed for companies implementing Six Sigma quality initiatives in manufacturing processes, these plans prove valuable for engineers in both developing and developed countries. The suggested plans not only aid producers in minimizing wastages and improving profits with higher probabilities of acceptance but also prioritize consumer protection and satisfaction by ensuring enhanced quality with fewer or no defects in the long run. Radhakrishnan and Sivakumaran's work thus stands as a practical guide for industries seeking to optimize their quality control processes through Six Sigma methodologies.

In "Construction of Double Sampling Plan Indexed through Average Quality Level (2012)," authors R. Radhakrishnan and S. Pratheeba [10] present a constructive procedure for developing a double sampling plan based on the Average Quality Level (AQL) using the Truncated Binomial Distribution. The inclusion of a table streamlines plan selection, particularly beneficial for industries like manufacturing and logistics. By truncating the binomial distribution at x = 0, the method enhances practical applicability. The paper's contribution lies in providing companies with a reliable means to make informed decisions about lot acceptance or rejection when facing clients. This systematic approach not only facilitates efficient quality control but also boosts customer satisfaction by offering a well-defined framework for evaluating lot quality. Radhakrishnan and Pratheeba's work stands as a valuable resource, contributing to the optimization of decision-making processes in industries reliant on quality-level assessments.

In "Designing of Special Type of Double Sampling Plan for Compliance Testing through Generalized Poisson Distribution (2017)," authors V. Kaviayarasu and V. Devika [14] present a comprehensive exploration of the STDS plan's application in compliance testing. The study reveals a noteworthy reduction in sample size compared to SSP, particularly in destructive or safety-related testing scenarios, showcasing its potential cost and time-saving benefits. The incorporation of the Generalized Poisson Distribution enhances the probability of acceptance over the traditional Poisson distribution, ensuring robust quality control in manufacturing. Overall, the research offers a valuable alternative method for quality engineers seeking efficiency gains and improved product quality assurance in sampling inspection processes.

Kaviyarasu and Devika (2018) present a novel method for crafting a Special Type Double Sampling (STDS) plan using the Generalized Poisson Distribution (GPD) [11]. Their approach emphasizes achieving optimal quality levels for producers and consumers while refining the Operating Characteristic (OC) curve. Through the Minimum Angle Method, the study minimizes angles between crucial points, aiding quality controllers in lot sentencing and risk assessment. The proposed plan offers balanced protection for both parties in manufacturing, ensuring efficient product quality inspection. This research hints at future explorations in the economic dimensions of inspection procedures.

In "A Procedure for Finding Double Sampling Plans for Attributes (2018)," William C. Guenther [16] outlines a method for obtaining double sampling plans and highlights the ease of subsequent operational characteristic (OC) and average sample number (ASN) curve calculations. The conclusion underscores the practicality of this approach, suggesting that once a double sampling plan is acquired through the described method, it becomes straightforward to compute OC and ASN values using provided tables and a desk calculator. This efficiency in calculations distinguishes the presented procedure, eliminating the need for complex computations and computer programs. Guenther's contribution facilitates a user-friendly approach to evaluating the performance of double sampling plans, streamlining the process for quality control professionals. The study encourages the application of this methodology, emphasizing its accessibility and applicability in real-world scenarios.

In "Designing Double Sampling Plans under the Conditions of Zero-Inflated Poisson Distribution (2018)," authored by K. Shalini and A. Sheik Abdullah [17], the study addresses the prevalence of zero nonconformities in well-equipped production processes and proposes a zero-inflated Poisson (ZIP) distribution as an appropriate model for such occurrences. The paper derives the Operating Characteristic (OC) function and Average Sample Number (ASN) function for Double Sampling Plans (DSP) under the conditions of ZIP distribution. The outlined procedures for designing and selecting DSPs in this context offer practical insights. Notably, tables are provided, presenting DSPs under ZIP distribution for specified strength levels. The comparison with ZIP Single Sampling Plans (SSPs) reveals that DSPs designed under ZIP distribution are significantly more efficient. The adoption of ZIP DSPs ensures protection for both producers and consumers, aligning with the overarching goal of enhancing quality control in production processes. Overall, k. Shalini and A. Sheik Abdullah's work contributes valuable methodologies for designing effective sampling plans in the unique context of zero-inflated Poisson distributions.

In "Variable Stage-Independent Double Sampling Plan with Screening for Acceptance Quality Loss Limit Inspection Scheme (2019)," Ikuo Arizono, Kazunori Yoshimoto, and Ryosuke Tomohiro [18] introduce a comprehensive sampling inspection plan indexed by quality loss, focusing specifically on the Variable Stage-Independent Double Sampling Plan with Screening (SIDSPS) for AQLL inspection schemes. The study offers a detailed design procedure, encompassing the 1st-stage sample size, acceptance and rejection criteria, 2nd-stage sample size, and acceptance criterion to meet the required conditions. The successful extension of choices in selecting a sampling procedure, considering both ATI and ASF, marks a significant contribution. While acknowledging its theoretical nature, the study calls for future applications of SIDSPS in practical scenarios, highlighting its potential in real-world AQLL inspection schemes.

In "Double-Acceptance Sampling Plan for Exponentiated Frechet Distribution with Known Shape Parameters (2021)," M. Sridhar Babu et al [19]. present a robust double-sampling procedure based on a truncated life test for decision-making in lot approval or rejection. The study focuses on the exponentiated Fréchet distribution, known for its flexibility in system reliability analysis due to its adaptable failure rate. Notably, the research observes a consistent decline in required sample sizes with the experiment's duration, showing resilience to changes in confidence levels or shape parameters. The comparative analysis indicates that the double sampling plan outperforms a single sampling plan in terms of Operating Characteristic (OC) values, emphasizing its suitability for practical applications. The recommendation of a variable sampling plan underscores the plan's ability to utilize all available details, providing a more comprehensive approach. The paper suggests potential future research avenues for establishing double acceptance sampling plans on variables, contributing to advancements in quality control methodologies.

In "A Design for Special Type Double Sampling Plan under Fuzzy Environment (2022)," authors V. Sangeetha and K.S. Karunya [21] introduce a Fuzzy Special Type Double Sampling Plan (FSTDSP) utilizing the fuzzy Poisson distribution. The paper highlights the calculation and presentation of the Fuzzy Operating Characteristic Curve, offering insights into the design of the FSTDSP. The incorporation of fuzzy parameters in the sampling plan provides upper and lower bounds in the probability of acceptance, enhancing the plan's adaptability to uncertain conditions. Moreover, the study emphasizes the significance of optimizing sample size within the fuzzy framework, contributing to the overall efficiency of the proposed FSTDSP. This research marks a valuable exploration into the application of fuzzy logic in the design of special-type double-sampling plans, setting the stage for further advancements in quality control methodologies.

4.3. Other Sampling Plans:

"Performance of Variable Sampling Plans When the Normal Distribution is Truncated" by Helmut Schneider (1984). Helmut Schneider's [2] exploration of variable sampling plans within the context of truncated normal distributions, as summarized in the conclusion, sheds light on both the advancements and challenges in statistical methodologies. The decision to initially focus on the singly truncated normal distribution suggests a systematic and methodical approach to the study. The author recognizes the significance of extending this analysis to the doubly truncated scenario, acknowledging its relevance in real-world applications. This progression aligns with the natural evolution of research, where the complexities of practical situations often require a step-by-step exploration.

Operating Characteristic (OC) functions and Acceptance sampling plans (2004), The conclusion by Dr. Jorge and Dr. Romeu [4] highlights the significance of the Operating Characteristic (OC) Function in devising acceptance sampling plans that effectively balance both producer's and consumer's risks (α, β). The OC Function proves instrumental in estimating optimal sample sizes "n" with high confidence to detect failures in experiments. These properties enable stringent control over incoming product quality and contribute to designing more efficient experiments. The overview of OC Function implementation covers a range of discrete and continuous distributions, demonstrating its versatility. The authors suggest that the principles outlined can be extended to implement OC Functions for other distributions.

W.L Pearn and Chein–wei Wu's [6] article, "Critical Acceptance Values and Sample Sizes of a Variables Sampling Plan for Very Low Fraction of Defectives" (2006), article introduces a variable sampling plan tailored for situations with minimal defectives, addressing quality control challenges amidst technological advancements and customer demands. Leveraging the uniformly most powerful test of capability indices, their method precisely determines sample sizes and critical acceptance values using exact sampling distributions, bolstering decision-making reliability. The practical application in EEPROM manufacturing underscores the approach's real-world effectiveness, significantly advancing acceptance sampling plan optimization in contexts with minimal defects.

The paper Acceptance sampling plans by variables for a class of symmetric distributions (2007), by R. P Suresh and T.V Ramanathan [7] proposes a research sampling plan for estimating the percentage of defectives, addressing the limitations of normal sampling plans when normality assumptions are violated. Through numerical studies, the proposed plan demonstrates superiority in handling symmetric non-normal distributions. The conclusion emphasizes the advantages, particularly in terms of departure from normality and sample size reduction, recommending the use of these plans with a carefully chosen parameter (m). The suggested range for m (10 to 15) accommodates the fairly thick-tailed and symmetric nature of the distribution, making it suitable for modeling non-normal symmetric distributions.

In "An Application of Single and Double Acceptance Sampling Plans for a Manufacturing System (2010)," Erdal Aydemir and Mehmet Onur Olgun [9] concentrate on evaluating bearing cap parts within a bakery machine manufacturing system. The paper explores single and double-acceptance sampling plans in evaluating bearing cap parts within bakery machine manufacturing. Their study highlights the plans' effectiveness in analyzing input quality control processes and optimizing manufacturing efficiency. The research underscores strategic acceptance sampling for enhanced cost-effectiveness, suggesting further exploration into acceptance plan selection and its impact on sampling and inspection costs, especially in comparison to alternative methods like multiple and sequential plans.

Sampling plans for beta distributed compositional fractions (2016) by K. Govindaraju and R. Kissling [12], The article emphasizes the necessity of food quality inspection in international trade and highlights the prevalence of compositional fractions in food products, often with non-normal distributions. Real-life examples are used to illustrate the determination of variables sampling inspection plans based on the beta distribution, demonstrating their economic advantages, particularly when dealing with known θ variables. The article suggests that when θ is unknown, an increased sampled amount is required to accurately estimate the precision parameter and control consumer risks effectively. In conclusion, the study establishes the superiority of beta distribution-based plans in managing the complexities of compositional fractions, offering practical insights for quality control in the food industry.

Conclusion

In conclusion, the extensive review of single and double-sampling plans reveals a diverse landscape of methodologies and applications in statistical quality control. The meticulous exploration of single and double sampling plans, coupled with real-life examples such as the Single Sampling Plan for OC Curve, highlights the importance of aligning decisions with industry standards. The highlighted studies contribute valuable insights, addressing challenges such as non-normality, correlated data, and distributional assumptions while providing practical solutions and recommendations for optimizing quality assurance strategies across various industries. This comprehensive analysis underscores the evolving nature of statistical quality control, offering a foundation for continued advancements in sampling plan design and implementation.

References

[1] Grundman R. A., & Ecanow B, Tablet Acceptance by a Double Sampling Plan. Journal of Pharmaceutical Sciences, 53(12), 1964,1526–1530.

[2] Helmut Schneider. Performance of Variable Sampling Plans When the Normal Distribution is Truncated. *Directorate of Mathematical & Information Sciences*, 1984, Mimeo Series No-1559.

[3] Anup Majumdar, Systems of Double Sampling Plans for Fixed Sample Sizes, *Calcutta Statistical Association Bulletin*, 34(4), 1985, 233-236

[4] Dr. Jorge & Dr. Romeu, Operating Characteristic (OC) functions and Acceptance sampling plans, *Selected Topics in Assurance Related Technologies*, 11(8), 2004, 1-8.

[5] Wolf Krumbholz & Andreas Rohr, The Operating Characteristic of Double Sampling Plans by Variables When the Standard Deviation is Unknown. *Allgemeines Statistisches Archiv*, 90, 2004, 233-251.

[6] Pearn W.L & Chein–Wei Wu, Critical Acceptance Values and Sample Sizes of a Variables Sampling Plan for Very Low Fraction of Defectives. *The International Journal of Management Science*, 34(1), 2006, 90-101.

[7] Suresh R. P., & Ramanathan T.V, Acceptance sampling plans by variables for a class of symmetric distributions, *Communications in Statistics - Simulation and Computation.* 26(4), 2007, 1379-1391.

[8] Radhakrishnan. R & Sivakumaran P.K, Construction of Double Sampling Plans through Six Sigma Quality Levels, *International Journal of Computational Science and Mathematics.* 4(1), 2009, 63-68.

[9] Erdal Aydemir & Mehmet Onur Olgun, *An Application of and Double Acceptance Sampling Plans for a Manufacturing System.*

Journal of Engineering Science and Design, 1(2),2010, 65-71.

[10] Radhakrishnan R., & Pratheeba, S, Construction of Double Sampling Plan Indexed through Average Quality Level. *International Journal of Computational Science and Mathematics*. 4(1), 2012, 63-68.

[11] Geetha Sathya Narayanan & Vijayaraghavan Rajarathinam, A Procedure for the Selection of Single Sampling Plans by Variables Based on Pareto Distribution, *Journal of Quality and Reliability Engineering*, 2013, 1-5.

[12] Govindaraju K., & Kissling R, Sampling plans for beta distributed compositional fractions. *Chemometrics and Intelligent Laboratory Systems*, 151 (2016), 2016, 103–107.

[13] Mujahida Sayyed, variable sampling plan for correlated data. *International Journal of Scientific Research in Mathematical and Statistical Sciences*, 3(2), 2016, 9-12.

[14] Kaviayarasu V & Devika V, Designing of Special Type of Double Sampling Plan for Compliance Testing through Generalized Poisson Distribution. *International Journal of Pure and Applied Mathematics*,117(12), 2017, 7-17.

[15] Kaviayarasu V & Devika, V, Optimization of Special Type Double Sampling Plan using Generalized Poisson Distribution through Minimum Angle Method, *International Journal of Statistics and Applied Mathematics*, 3(6), 2018, 10-13.

[16] William C. Guenther, A Procedure for Finding Double Sampling Plans for Attributes. *Journal of Quality Technology*, 2(4), 2018, 219-225.

[17] Shalini K & Sheik Abdullah A, Designing Double Sampling Plans under the Conditions of Zero-Inflated Poisson Distribution. *Journal of Emerging Technologies and Innovative Research*, 5(12), 2018, 529-534.

[18] Ikuo Arizono, Kazunori Yoshimoto, & et.al, Variable Stage-Independent Double Sampling Plan with Screening for Acceptance Quality Loss Limit Inspection Scheme, *International Journal of Production Research*, 58(8), 2019, 2550-2559.

[19] M. Sridhar Babu et al., Double-Acceptance Sampling Plan for Exponentiated Fréchet Distribution with Known Shape Parameters, *Mathematical Problems in Engineering*, 2021, 1-9.

[20] Vijayaraghavan R, & Pavithra A, Selection of Single Sampling Plans by Variables Based on Generalized Beta Distribution. *Reliability analysis of a maintenance schedule,* 17(2), 2022, 136-150.

[21] Sangeetha V & Karunya K.S, A Design for Special Type Double Sampling Plan under Fuzzy Environment. *International Journal of Applied Research*, 8(5), 2022, 117-120.