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Bayesian Skip Lot Sampling Plan V With Double Sampling Plan as Reference Plan Indexed through Relative Slopes

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Abstract

Designing acceptance sampling plans when the OC curve is assumed to follow two points namely (AQL, 1-α), (LQL, β) was well studied by Cameron (1952). Further various authors studied designing of acceptance sampling plan through Bayesian approach. Bayesian sampling plan is that experiment or analytical study which can yield prior frequency distribution for the quality of the submitted lots and these 'prior' distributions can in turn be used to derive lot-by-lot sampling plans. In this paper, selection of Bayesian Skip-lot sampling plan with Double Sampling Plan as reference plan tabulate through purchaser and manufacturer quality levels and with their relative slopes. Necessary illustrations are also provided for the proper application of the procedure towards shop floor conditions.

Key Words:*Skip-lot Sampling Plan, Double Sampling Plan, Acceptable Quality Level, Limiting Quality Level, Indifference Quality Level, Relative slopes, Gamma-Poisson Distribution.*

1. Introduction

Bayesian acceptance sampling using sampling proceedings to complete whether to accept or reject a product or process. It has been a simple quality control technique that used in industry and especially in military for contracts and procurement of products. It is commonly done as products that leave the factory or in some cases even within the factory.Most often a manufacturer supplies number of items to purchaser and decision to accept or reject the lot is made through determining the number of defective items in a sample from that area. The area is accepted, if the number of defectives falsely the consent number or otherwise the lot is refused.Acceptance sampling by attributes each component is tested and confidential as conforming or non-conforming. A sampling is appropriated and contains too many non-conforming items, then the array is rejected, otherwise it is accepted.For this method to be active, batches containing some non-conforming items must be acceptable. If only acceptable percentage of non-conforming items is zero, this can only be accomplish through examine every items and removing the item which are nonconforming. This is accepted as 100% inspection. The acceptance sampling plans enforced on a lot-by-lot basis become an aspect in the overall access to maximize quality at minimum cost. Since different sampling plans may be statistically accurate at contrasting times during the process, therefore all sampling plans should be annually reviewed. Bayesian acceptance sampling access is combine with the utilization of prior process history for the choice of distribution (viz., gamma Poisson, beta binomial) to describe the random fluctuations elaborate in acceptance sampling, Bayesian sampling plan desire the user to specify especially the distribution of defective from lotto lot.The prior distribution is the normal distribution of a lot quality on which the sampling plan is going to act. The distribution is called prior, because it is define prior to the taking of samples. The consolidation of prior ability represented with the prior distribution and the experimental knowledge based on the sample leads to the decision on the lot.

Dodge (1955) has imported the approach of skip-lot sampling, by applying the principles of a continuous sampling plan of type CSP-1 to a series of lots or arrays of material. This plan is designated as the SkSP-1 plan and specifically pertinent for bulk materials or products produced in consecutive lots. Perry (1970) has developed a system of sampling inspection plan known as

SkSP-2. This Plan affect inspection of only a fraction '*f* ' of the agreed lots when quality of the submitted product is good as demonstrated by the quality of the product.

Hsu (1977) the skip-lot sampling schemes are economically auspicious and helpful to decrease the cost of the inspection of the final lots. Hamaker (1955) has also demonstrated that the changes between the two methods of matching, namely matching of the OC curves for the double sampling plan and the single sampling plans using p_0 and $h_0$and that using $p_{0.10}$ and $p_{0.95}$ are affrontand they amount to not added to 5 percent of the sample size.

Calvin (1984) has conferred in a clear and concise treatment by means of 'how and when to perform Bayesian acceptance sampling'. These proceeding are suited to the sampling of lots from process or assembly operations, which contain assignable causes. Soundararajan and Vijayaraghavan (1989) have introduced Skip-lot sampling plans, designated as SkSP-3, based on the principles of CSP-2 of Dodge and Torrey (1951).Hald (1960) has borrowed optimal solutions for the cost function $k\ (n, c)$ any cases where the previous distribution is rectangular, polya and binomial. Tables are given for choice$n$, c and $k\ (n, c)$ for various forms of the prior distribution for differently of the parameters, which is necessary conclusion on Bayesian Acceptance Sampling (BAS). Hald (1981) has also administer an accomplished comparison of Classical and Bayesian Theory and technique for attributes acceptance sampling.Suresh and Ramachandran (1991) have proposed selection procedure for SkSP-2 with DSP (0,1) as reference plan indexed through AQL and AOQL. Govindaraju and Subramani (1992) have designed double sampling plans in such a way as to obtain a plan having minimum sum of producer and consumer risks. Vijayaraghavan and Soundararajan (1998) advanced a design for skip lot sampling inspection plans with the double sampling plan as the reference plan, so as to cut down the sample size and assemble more adequate plans in return for the same sampling achievement. The ability of the proposed plan correlated with that of the conventional double sampling plan is reviewed.

Suresh and Latha (2001) have inspected Bayesian Single Sampling Plan for a gamma prior distribution.Vijayaraghavan, et al (2007, 2008) assess the characterization of OC curves of single sampling plans by attributes for contrasting sets of plan parameters settled on Gamma-Poisson distribution and leading of iterative algorithm for scheming Gamma-Poisson sampling plans for stated requirements.

Balamurali and Jun (2011) progressive a current system of skip lot sampling plan labled as SkSP-V established on the principles of CSP-V plan.This plan desire the return to the normal inspection whenever the lot is rejected, but it has a provision for a decreased normal inspection upon expression of superior brand quality. Balamurali and Subramani (2012) expected the optimal designing technique tocomplete the parameters of a Skip-lot sampling plan of type SkSP-2 with double sampling plan as attributing plan. The two dots on the operating characteristic curve connection are used to meet the optimal parameters of the expected plan. Tables are also established by seeing the various combinations of acceptable quality level and limiting quality level forward with corresponding manufacturer and customers risks.

Muhammad Aslamet. al (2012) has calculated optimal scheming of an SkSP-V skip lot sampling plan with Double Sampling Plan as the notice plan. The design parameters are decisive so as to reduce the average sample number while the described manufacturer risk and the customers risks are contented. Saminathan Balamuraliet. al (2012) planned a Bayesian Double Sampling Plan for the analysis of attribute quality characteristics covered by the Gamma-Poisson distribution. The design parameters of the scheduled plan such as the sample sizes and the acceptance numbers are decisive for specified two points on operating characteristics curve such as acceptable quality level and limiting quality level forward with the answering manufacturers and the customer's risks. The optimal parameters are purposeful the smallest average sample number proof.

Suresh and Usha (2013) have investigated the collection of Bayesian Skip-lot sampling plan with Special Type Double Sampling plan as reference plan tabulated through customer and manufacturer quality levels. Pholkris Koatpoothon and Prapaisri Sudasna–na–Ayudthya (2014) approved the comparison of Skip lot sampling plan SkSP-2 and SkSP-V in particulars of probability obtain, (Pa), Average Outgoing Quality(AOQ), ASN, ATI and further cost devaluation.

Suresh and Umamaheswari(2016) advanced manufacturer and customers risks are diminish with acceptable and limiting quality levels which accounts for the prior distribution of process state for each lot and credit received appreciably which reduces destructing testing.

2. Unity Value Approach for the selection of BDSP-(n_1, n_2, c_1, c_2) for specified p_1, p_2, α and β using Gamma-Poisson Distribution

A general double sampling plan by attributes covered by Bayesian perspective is stated with four parameters, viz, n_1, n_2, $c_1$and c_2. These parameters can be determined by unity value approach covered the conditions of Gamma Poisson distribution. Table 1 arrangedthe unity values np_1 and np_2consolidation to $Pa(p_1) = 1\text{-}\alpha = 0.95$ and $P_a(p_2) = \beta = 0.10$ for various combinations of f, i, k respectively. The unity values are accessed by solving the OC function of BDSP-(n_1, n_2, c_1, c_2) under the intuitions of Gamma-Poisson distribution using the method of successive approximation for each combination of c_1 and c_2 with $n_1 = n_2 = n$.

3. Procedure for the selection of a desired plan

For a described set of elements in terms of conservation to the manufacturer and the customer, a desired plan is chosen based on the procedure given below:

1. Specify the points (AQL, $1\text{-}\alpha$) and (LQL, β) through which the desired OC curve is expected to pass.
2. Find the operating ratio, $R = p_2/p_1$
3. Prefer the unity value $n\mu_1$ and the acceptance numbers correlate with an operating ratio which is close to R from the allotted Table 2 comparable to s, f, i, i_{dsp} and k.
4. Complete the sample size as $n = n\mu_1 / \mu_1$ and round up to the nearest integer.

Example 3.1

1. Given that $\mu_1 = 0.01$ and $\mu_2 = 0.15$ with correlate risks$\alpha = 0.05$ and $\beta = 0.10$.
2. The operating ratio of resolved as R = 0.15/0.01 = 15
3. From Table 2, the operating ratio is R = 15.74292, which is closer to 15 and is correlate with the acceptance numbers $c_1 = 0$ and $c_2 = 1$, $i = 2$, $k = 2$, $s = 5$ and$f = 1/5$ when$i_{dsp} = 2$.
4. $n = n\mu_1 / \mu_1 = 0.2120 / 0.01 = 21.2 \approx 21$

4. Plotting of OC curve

Division of each entries of the row corresponding to the value of $n = 40$, $i = 1$, $k = 2$, $s = 2$,$f = 1/3$ when $i_{dsp} = 2$ of Table 1 by 40 leads to the following value given in the table for plotting the OC curve of Bayesian Skip-lot Sampling Plan V with Double Sampling Plan as reference plan (40; 1, 2, 2, 1/3).

Pa(μ)	0.99	0.95	0.75	0.50	0.10	0.05	0.01
μ	0.00119	0.00471	0.02234	0.05230	0.220325	0.33841	0.82956

5. Finding OAOQL (Overall Average Outgoing Quality Limit) for a given Bayesian SkSP-V with Double Sampling Plan

For the given Bayesian SkSP-V with Double Sampling Plan ($c_1 = 0$, $c_2 = 1$) and i, k, f, s, i_{dsp} the value of OAOQL can be obtained using the values of Table 3. Corresponding to the given i, f, k, i_{dsp} and s, the value of nOAOQL is identified which when divided by the sample size which yields OAOQL.

Example 5.1

For the Bayesian SkSP-V with DSP n = 15, i = 2, k = 1, f = 1/3, i_{dsp}= 2 and s = 4, Calculate OAOQL. Using the Table 3 corresponding to i = 2, k = 1, f = 1/3, i_{dsp} = 2 and s = 4, one finds that nOAOQL = 0.1713. Dividing this by the given sample size n = 15, one gets OAOQL as 1.14 percent. In this example the corresponding value of $n\mu_m$, where μ_m is the quality level at which the Overall Average Outgoing Quality (OAOQ) curve attains maximum, is found as 0.1807 when divided by given n. Yields the value of μ_m as 1.2 percent. This would mean that when the lots are subject to the inspection of the above sampling plan the worst quality level which the consumer will receive is 1.14 percent, which occurs when the incoming quality is 1.2 percent and for any other incoming quality levels the overall average outgoing quality level which the consumer wil receive will be less than 1.14 percent.

6. Designing Bayesian SkSP-V with DSP indexed by AQL and OAOQL

It is the usual practice in selecting a sampling plan to fix the operating characteristic curve in accordance with desired discrimination. The OC curve is, in turn, fixed by suitably chosen parameters such as considering two points on it, namely $(p_1, 1\text{-}\alpha)$ *or* (p_2, β) or considering only one point on it, namely $(p_1, 1\text{-}\alpha)$ *or* (p_2, β) along with some conditions.

Example 6.1

Given that AQL = 2 percent and OAOQL = 3 percent, find the Bayesian SkSP-V with DSP (c_1 = 0, c_2 = 1) satisfying these requirements.The ratio OAOQL/AQL = 3/2 = 1.5 which is closed to 1.474 of Table 3 and corresponds to i= 1, k = 1, f = 1/4, i_{dsp} = 2 and s = 1. Corresponding to this value 1.5 of OAOQL/AQL, nOAOQL is observed as 0.485682 which then divided by the given OAOQL yields n = 16. Hence the Bayesian SkSP-V with DSP satisfying the given requirements is given as n = 16, i= 1, k = 1, f = 1/4, i_{dsp}= 2 and s = 1.

7.Designing of Bayesian SkSP-V with Double Sampling Plan as reference plan indexed with relative slopes of Acceptable and Limiting quality levels

7. 1 Selection of parameters with relative slope h_1 at the Acceptable Quality Level

Table 4 is used to select the parameters for Bayesian SkSP-V with Double Sampling plan (c_1= 0, c_2= 1) as reference plan indexed with $\mu_1$and h_1. For example, givenμ_1= 0.01 and h_1 = 0.37 from Table 4 under the column headed h_1, locate the value which is equal to or just greater than the desired value h_1. Corresponding to this h_1, the values of parameters associated with the relative slopes are $n\mu_1$= 0.1885, s = 2, i = 1, k = 2, i_{dsp} = 2 and f = 1/3. From this one can obtain the sample size as $n = n\mu_1 / \mu_1$= 18.85 ≈ 19. Thus the parameters are n = 19, s =2, i = 1, k = 2, i_{dsp}= 2 and f = 1/3.

7.2 Selection of parameters with relative slope $h_2$at the Limiting Quality Level

Table 4 is used to select the parameters for Bayesian SkSP-V with Double Sampling plan (c_1= 0, c_2= 1) as reference plan indexed with $\mu_2$and h_2. For example, givenμ_2= 0.2 and h_2 = 28.33 from Table 4 under the column headed h_2, locate the value which is equal to or just greater than the desired value h_2. Corresponding to this h_2, the values of parameters associated with the relative slopes are $n\mu_2$= 7.0505, s = 3, i = 1, k = 3, i_{dsp}= 2 and f = 1/4. From this one can obtain the sample size as $n = n\mu_2 / \mu_2$= 35.25 ≈ 35. Thus the parameters are n = 35, s = 3, i = 1, k = 3, i_{dsp} = 2 and f = 1/4.

7.3 Selection of parameters with relative slope $h_0$at Indifference Quality Level

Table 4 is used to select the parameters for Bayesian SkSP-V with Double Sampling plan (c_1= 0, c_2= 1) as reference plan indexed with μ_0 and h_0. For example, givenμ_0 = 0.03 and h_0= 15.21 from Table 4 under the column headed h_0,locate the value which is equal to or just greater than the desired value h_0. Corresponding to this h_0, the values of parameters associated with the relative slopes are $n\mu_0$ = 1.4105, s = 4, i = 2, k = 1, i_{dsp} = 2 and f = 1/5. From this one can obtain the sample size as $n = n\mu_0/\mu_0$= 47.02 ≈ 47. Thus the parameters are n = 47, s = 4, i = 2, k = 1, i_{dsp} = 2 and f = 1/5.

8.Construction of Tables

The probability of acceptance for Bayesian SkSP-V with Double Sampling Plan(c_1= 0, c_2 = 1) as reference plan given as

$$P(\mu)=\frac{fP+(1-f)P^{i}+fP^{k+1}(P^{i}-P^{k})}{f(1+P^{i+k}-P^{2k})+(1-f)P^{i}} \qquad (1)$$

Where P is the operating characteristic function for Bayesian Double Sampling Plan.

The expression for APA function for Bayesian Double Sampling Plan $\overline{P}$ is given in equation

$$\overline{P} = \int P_a \, w(p)\, dp$$

$$P=\frac{s^{s}}{(s+n\mu)^{s}}+\frac{n\mu\, s^{s}}{(s+n\mu+n\mu i)^{s+1}} \qquad (2)$$

Where $\mu = s/t$, is mean value of the product quality p.

$$\text{OAOQ} = \int p.\, P_a(p)\, d\, w(p) \qquad (3)$$

The relative slope h at μ is,

$$h=\frac{-\mu}{\overline{P}}\,\frac{d\overline{P}}{d\mu} \qquad (4)$$

Differentiating the APA function with respect to μ and equating at μ, one get various values of (s, i, f, k) and their corresponding $n\mu_1$,$n\mu_0$,$n\mu_2$ values are substituted in the equation 3 and the relative slopes at $\mu = \mu_0, \mu_1, \mu_2$,the values of h_0, h_1, $h_2$are obtained and tabulated in Table 4

Table 1 : Certain $n\mu$values for Bayesian SkSP-V with DSP as reference plan for i_{dsp} = 2

f	***i***	***k***	***s***	**Probability of Acceptance**						
				0.99	**0.95**	**0.75**	**0.5**	**0.1**	**0.05**	**0.01**
2/3	1	1	1	0.0475	0.1650	0.6820	1.7865	15.1345	31.7960	165.1350
½				0.0710	0.1885	0.8700	2.3505	20.1400	42.3475	220.1485
1/3				0.0945	0.2590	1.2460	3.4550	30.1275	63.4740	330.1520
¼				0.0945	0.3295	1.5985	4.5830	40.1385	84.5770	440.1555
1/5				0.1180	0.4000	1.9745	5.6875	50.1260	105.6800	550.1590
2/3				0.0240	0.1180	0.5175	1.2460	5.7815	9.0950	22.9365

½	1	2	2	0.0240	0.1415	0.6350	1.5515	6.9095	10.7400	26.7670
1/3				0.0475	0.1885	0.8935	2.0920	8.8130	13.5365	33.1825
¼				0.0475	0.2355	1.1285	2.5855	10.4110	15.9100	38.6110
1/5				0.0710	0.2825	1.3400	3.0085	11.8445	17.9780	43.3815
2/3	1	3	3	0.0005	0.0945	0.4705	1.1285	4.3715	6.3220	12.9960
½				0.0240	0.1180	0.5880	1.3635	5.0530	7.2385	14.5940
1/3				0.0240	0.1650	0.8230	1.8100	6.1575	8.6720	17.1320
¼				0.0475	0.2120	1.0110	2.1860	7.0505	9.8235	19.1530
1/5				0.0475	0.2590	1.1990	2.4915	7.8025	10.8105	20.8450
2/3	2	1	4	0.0005	0.0945	0.4470	0.9405	3.2200	4.5360	8.6720
½				0.0240	0.1180	0.5175	1.0345	3.2670	4.5830	8.6955
1/3				0.0240	0.1650	0.6585	1.1990	3.4080	4.6535	8.7190
¼				0.0475	0.2120	0.7525	1.3165	3.5020	4.7240	8.7660
1/5				0.0475	0.2590	0.8230	1.4105	3.5960	4.7945	8.7895
2/3	2	2	5	0.0005	0.0945	0.4235	0.8935	3.0085	4.1600	7.5675
½				0.0240	0.0945	0.4940	0.9875	3.0555	4.1835	7.5910
1/3				0.0240	0.1415	0.6115	1.1285	3.1730	4.2540	7.6145
¼				0.0240	0.1885	0.6820	1.2460	3.2670	4.3245	7.6380
1/5				0.0475	0.2120	0.7760	1.3400	3.3375	4.3950	7.6615
2/3	2	3	6	0.0005	0.0710	0.4000	0.8700	2.8675	3.9250	6.9330
½				0.0005	0.0945	0.4705	0.9640	2.9380	3.9485	6.9330
1/3				0.0240	0.1415	0.5880	1.1050	3.0320	4.0190	6.9565
¼				0.0240	0.1650	0.6820	1.2225	3.1025	4.0895	6.9800
1/5				0.0475	0.2120	0.7525	1.3165	3.1730	4.1365	7.0035
2/3	3	1	7	0.0005	0.0710	0.4000	0.8230	2.7265	3.7370	6.5100
½				0.0005	0.0945	0.4470	0.8700	2.7265	3.7370	6.5100
1/3				0.0240	0.1415	0.5410	0.9405	2.7500	3.7370	6.5100
¼				0.0240	0.1885	0.6115	1.0110	2.7500	3.7370	6.5100
1/5				0.0475	0.2120	0.6585	1.0580	2.7735	3.7605	6.5100
2/3	3	2	8	0.0005	0.0710	0.3765	0.7995	2.6795	3.6195	6.2280
½				0.0005	0.0945	0.4235	0.8465	2.6795	3.6195	6.2280
1/3				0.0240	0.1415	0.5175	0.9170	2.6795	3.6430	6.2280
¼				0.0240	0.1650	0.5645	0.9875	2.7030	3.6430	6.2280
2/3	3	3	9	0.0005	0.0710	0.3765	0.7995	2.6325	3.5490	5.9930
½				0.0005	0.0945	0.4235	0.8465	2.6325	3.5490	5.9930
1/3				0.0240	0.1180	0.4940	0.9170	2.6325	3.5490	5.9930
¼				0.0240	0.1650	0.5645	0.9640	2.6560	3.5490	5.9930
1/5				0.0475	0.1885	0.6115	1.0110	2.6560	3.5490	5.9930

Table 2 :Operating Ratio values for Bayesian Skip-lot Sampling Plan V with DSP for $i_{dsp} = 2$

f	*i*	*k*	*s*	**μ$_2$ / μ$_1$for α=0.05**			**μ$_2$ / μ$_1$for α=0.01**		
				***α*=0.05**	***α*=0.05**	***α*=0.05**	***α*=0.01**	***α*=0.01**	***α*=0.01**

				β=0.10	β=0.05	β=0.01	β=0.10	β=0.05	β=0.01
2/3	1	1	1	91.72424	192.7030	1000.8181	318.62105	669.38947	3476.5263
1/2				106.8435	224.6551	1167.8965	283.66197	596.44366	3100.6831
1/3				116.3223	245.0733	1274.7181	318.80952	671.68254	3493.6719
1/4				121.8163	256.6828	1335.8285	424.74603	894.99471	4657.7301
1/5				125.31500	264.20000	1375.39750	424.79661	895.59322	4662.3644
2/3	1	2	2	48.99576	77.07627	194.37712	240.89583	378.95833	955.68750
1/2				48.83039	75.90106	189.16608	287.89583	447.50000	1115.29167
1/3				46.75332	71.81167	176.03448	185.53684	284.97895	698.57895
1/4				44.20807	67.55839	163.95329	219.17895	334.94737	812.86316
1/5				41.92743	63.63894	153.56283	166.82394	253.21127	611.00704
2/3	1	3	3	46.25926	66.89947	137.52381	8743.00000	12644.000	25992.000
1/2				42.82203	61.34322	123.67797	210.54167	301.60417	608.08333
1/3				37.31818	52.55758	103.83030	256.56250	361.33333	713.83333
1/4				33.25708	46.33726	90.34434	148.43158	206.81053	403.22105
1/5				30.12548	41.73938	80.48263	164.26316	227.58947	438.84211
2/3	2	1	4	34.07407	48.00000	91.76720	6440.0000	9072.0000	17344.000
1/2				27.68644	38.83898	73.69068	136.12500	190.95833	362.31250
1/3				20.65455	28.20303	52.84242	142.00000	193.89583	363.29167
1/4				16.51887	22.28302	41.34906	73.72632	99.45263	184.54737
1/5				13.88417	18.51158	33.93629	75.70526	100.93684	185.04211
2/3	2	2	5	31.83598	44.02116	80.07937	6017.0000	8320.0000	15135.000
1/2				32.33333	44.26984	80.32804	127.31250	174.31250	316.29167
1/3				22.42403	30.06360	53.81272	132.20833	177.25000	317.27083
1/4				17.33156	22.94164	40.51989	136.12500	180.18750	318.25000
1/5				15.74292	20.73113	36.13915	70.26316	92.52632	161.29474
2/3	2	3	6	40.38732	55.28169	97.64789	5735.0000	7850.0000	13866.000
1/2				31.08995	41.78307	73.36508	5876.0000	7897.0000	13866.000
1/3				21.42756	28.40283	49.16254	126.33333	167.45833	289.85417
1/4				18.80303	24.78485	42.30303	129.27083	170.39583	290.83333
1/5				14.96698	19.51179	33.03538	66.80000	87.08421	147.44211
2/3	3	1	7	38.40141	52.63380	91.69014	5453.0000	7474.0000	13020.000
1/2				28.85185	39.54497	68.88889	5453.0000	7474.0000	13020.000
1/3				19.43463	26.40989	46.00707	114.58333	155.70833	271.25000
1/4				14.58886	19.82493	34.53581	114.58333	155.70833	271.25000
1/5				13.08255	17.73821	30.70755	58.38947	79.16842	137.05263
2/3	3	2	8	37.73944	50.97887	87.71831	5359.0000	7239.0000	12456.000
1/2				28.35450	38.30159	65.90476	5359.0000	7239.0000	12456.000
1/3				18.93640	25.74558	44.01413	111.64583	151.79167	259.50000
1/4				16.38182	22.07879	37.74545	112.62500	151.79167	259.50000
1/5				14.33952	19.32626	33.03979	56.90526	76.69474	131.11579
2/3				37.07746	49.98592	84.40845	5265.0000	7098.0000	11986.000
1/2				27.85714	37.55556	63.41799	5265.0000	7098.0000	11986.000

1/3	3	3	9	22.30932	30.07627	50.78814	109.68750	147.87500	249.70833
1/4				16.09697	21.50909	36.32121	110.66667	147.87500	249.70833

Table 3 :Parametric values for the Bayesian SkSP-V with DSP as reference plan for i_{dsp}= 2

f	*i*	*k*	*s*	$n\mu_1$	$n\mu_2$	μ_2/μ_1	$n\mu_m$	$Pa(\mu_m)$	***nOAOQL***	$OAOQL/\mu_1$
2/3	1	1	1	0.1650	15.1345	91.7242	0.5802	0.786043	0.456062	2.76401
½				0.1885	20.1400	106.8435	0.5600	0.836529	0.468456	2.48517
1/3				0.2590	30.1275	116.3224	0.5400	0.889259	0.480200	1.85405
¼				0.3295	40.1385	121.8164	0.5300	0.916381	0.485682	1.47399
1/5				0.4000	50.1260	125.3150	0.5150	0.934209	0.481118	1.20279
2/3	1	2	2	0.1180	5.7815	48.9958	0.5100	0.756607	0.385870	3.27008
½				0.1415	6.9095	48.8304	0.4900	0.810844	0.397314	2.80787
1/3				0.1885	8.8130	46.7533	0.4600	0.872438	0.401322	2.12902
¼				0.2355	10.4110	44.2081	0.4555	0.901511	0.410638	1.74368
1/5				0.2825	11.8445	41.9274	0.4450	0.921362	0.410006	1.45135
2/3	1	3	3	0.0945	4.3715	46.2593	0.4815	0.749076	0.360680	3.81672
1/2				0.1180	5.0530	42.8220	0.4515	0.808653	0.365107	3.09412
1/3				0.1650	6.1575	37.3182	0.4305	0.868115	0.373723	2.26499
1/4				0.2120	7.0505	33.2571	0.4205	0.899334	0.378170	1.78382
1/5				0.2590	7.8025	30.1255	0.4100	0.919576	0.377026	1.45569
2/3	2	1	4	0.0945	3.2200	34.0741	0.1885	0.897921	0.169258	1.79109
1/2				0.1180	3.2670	27.6864	0.1845	0.922732	0.170244	1.44274
1/3				0.1650	3.4080	20.6545	0.1807	0.948009	0.171305	1.03821
1/4				0.2120	3.5020	16.5189	0.1787	0.960867	0.171707	0.80993
1/5				0.2590	3.5960	13.8842	0.1775	0.968632	0.171932	0.66383
2/3	2	2	5	0.0945	3.0085	31.8360	0.1290	0.926480	0.119516	1.26471
1/2				0.0945	3.0555	32.3333	0.1259	0.944353	0.118894	1.25813
1/3				0.1415	3.1730	22.4240	0.1228	0.962605	0.118208	0.83539
1/4				0.1885	3.2670	17.3316	0.1213	0.971842	0.117884	0.62538
1/5				0.2120	3.3375	15.7429	0.1200	0.977510	0.117301	0.55330
2/3	2	3	6	0.0710	2.8675	40.3873	0.1609	0.903118	0.145312	2.04664
1/2				0.0945	2.9380	31.0899	0.1538	0.926890	0.142556	1.50852
1/3				0.1415	3.0320	21.4276	0.1472	0.950950	0.139980	0.98925
1/4				0.1650	3.1025	18.8030	0.1440	0.963116	0.138689	0.84053
1/5				0.2120	3.1730	14.9670	0.1422	0.970429	0.137995	0.65092
2/3	3	1	7	0.0710	2.7265	38.4014	0.1181	0.930738	0.109920	1.54817
1/2				0.0945	2.7265	28.8519	0.1163	0.947641	0.110211	1.16625
1/3				0.1415	2.7500	19.4346	0.1146	0.964805	0.110567	0.78139
1/4				0.1885	2.7500	14.5889	0.1137	0.973513	0.110688	0.58720
1/5				0.2120	2.7735	13.0825	0.1132	0.978760	0.110796	0.52262
2/3				0.0710	2.6795	37.7394	0.0637	0.961813	0.061267	0.86292
1/2				0.0945	2.6795	28.3545	0.0628	0.971197	0.060991	0.64540

1/3	3	2	8	0.1415	2.6795	18.9364	0.0619	0.980697	0.060705	0.42901
1/4				0.1650	2.7030	16.3818	0.0614	0.985500	0.060510	0.36672
1/5				0.1885	2.7030	14.3395	0.0612	0.988370	0.060488	0.32089
2/3	3	3	9	0.0710	2.6325	37.0775	0.1922	0.875084	0.168191	2.36888
1/2				0.0945	2.6325	27.8571	0.1789	0.906173	0.162114	1.71549
1/3				0.1180	2.6325	22.3093	0.1670	0.937422	0.156550	1.32669
1/4				0.1650	2.6560	16.0970	0.1615	0.953083	0.153923	0.93286
1/5				0.1885	2.6560	14.0902	0.1583	0.962490	0.152362	0.808288

Table 4 :Relative slopes for Acceptable, Indifference and Limiting Quality Levels

f	i	k	s	$n\mu_1$	h_1	$n\mu_2$	h_2	$n\mu_0$	h_0	h_2/h_1
2/3	1	1	1	0.1650	0.272479	15.1345	22.884523	1.7865	2.876285	83.98645
1/2				0.1885	0.318600	20.1400	39.219796	2.3505	4.229044	123.1004
1/3				0.2590	0.456996	30.1275	85.322853	3.4550	7.679511	186.7037
1/4				0.3295	0.598417	40.1385	149.487330	4.5830	12.279029	249.8044
1/5				0.4000	0.743099	50.1260	231.554030	5.6875	17.904793	311.6059
2/3	1	2	2	0.1180	0.215778	5.7815	9.998616	1.2460	2.387321	46.33753
1/2				0.1415	0.267462	6.9095	14.806187	1.5515	3.280787	55.35816
1/3				0.1885	0.374130	8.8130	26.430481	2.0920	5.295234	70.6451
1/4				0.2355	0.484432	10.4110	40.313543	2.5855	7.692832	83.21813
1/5				0.2825	0.597779	11.8445	56.312275	3.0085	10.310810	94.20243
2/3	1	3	3	0.0945	0.175367	4.3715	8.293845	1.1285	2.396511	47.29419
1/2				0.1180	0.227720	5.0530	11.649138	1.3635	3.162602	51.15552
1/3				0.1650	0.338122	6.1575	19.409866	1.8100	4.941877	57.40497
1/4				0.2120	0.454600	7.0505	28.334705	2.1860	6.927365	62.32883
1/5				0.2590	0.575907	7.8025	38.191564	2.4915	9.002403	66.31554
2/3	2	1	4	0.0945	0.442150	3.2200	12.853353	0.9405	4.893038	29.07011
1/2				0.1180	0.586687	3.2670	17.119974	1.0345	6.311491	29.18074
1/3				0.1650	0.896255	3.4080	26.056177	1.1990	9.309873	29.07227
1/4				0.2120	1.224956	3.5020	34.953802	1.3165	12.265478	28.53474
1/5				0.2590	1.569974	3.5960	44.085164	1.4105	15.212386	28.08019
2/3	2	2	5	0.0945	0.707425	3.0085	15.309954	0.8935	6.061359	21.64179
1/2				0.0945	0.723094	3.0555	20.252249	0.9875	7.745573	28.00775
1/3				0.1415	1.174543	3.1730	30.295371	1.1285	10.971288	25.79332
1/4				0.1885	1.655506	3.2670	40.282820	1.2460	14.230856	24.33263
1/5				0.2120	1.916774	3.3375	50.097316	1.3400	17.437888	26.13626
2/3	2	3	6	0.0710	0.426749	2.8675	14.702063	0.8700	4.993663	34.4513
1/2				0.0945	0.596445	2.9380	19.614404	0.9640	6.538083	32.88551
1/3				0.1415	0.957602	3.0320	29.231519	1.1050	9.555697	30.52576
1/4				0.1650	1.159599	3.1025	38.672400	1.2225	12.673252	33.34981
1/5				0.2120	1.554674	3.1730	48.180787	1.3165	15.780175	30.99093
2/3				0.0710	0.542601	2.7265	16.334463	0.8230	7.490530	30.104

1/2	3	1	7	0.0945	0.777656	2.7265	21.748063	0.8700	9.735196	27.9661
1/3				0.1415	1.291416	2.7500	32.754001	0.9405	14.080998	25.3628
1/4				0.1885	1.864474	2.7500	43.554253	1.0110	18.631084	23.3600
1/5				0.2120	2.190773	2.7735	54.681364	1.0580	22.943624	24.9598
2/3	3	2	8	0.0710	1.128248	2.6795	23.446594	0.7995	11.776360	20.7814
1/2				0.0945	1.600775	2.6795	31.180024	0.8465	15.098437	19.4780
1/3				0.1415	2.649397	2.6795	46.527018	0.9170	21.342447	17.5613
1/4				0.1650	3.256809	2.7030	62.111483	0.9875	27.686397	19.0712
1/5				0.1885	3.901390	2.7030	77.260494	1.0345	33.562837	19.8033
2/3	3	3	9	0.0710	0.343498	2.6325	21.653084	0.7995	6.050013	63.0369
1/2				0.0945	0.489977	2.6325	28.798427	0.8465	8.200145	58.7750
1/3				0.1180	0.663104	2.6325	42.983460	0.9170	12.492244	64.8216
1/4				0.1650	1.027299	2.6560	57.502176	0.9640	16.587444	55.9741
1/5				0.1885	1.259375	2.6560	71.543148	1.0110	20.903139	56.8084

Fig. 1. Operating Characteristic Curve for Bayesian SkSP-V with Double Sampling Plan as reference plan with parameters i = 1, k = 2, s = 2, f = 1/3, i_{dsp} = 2

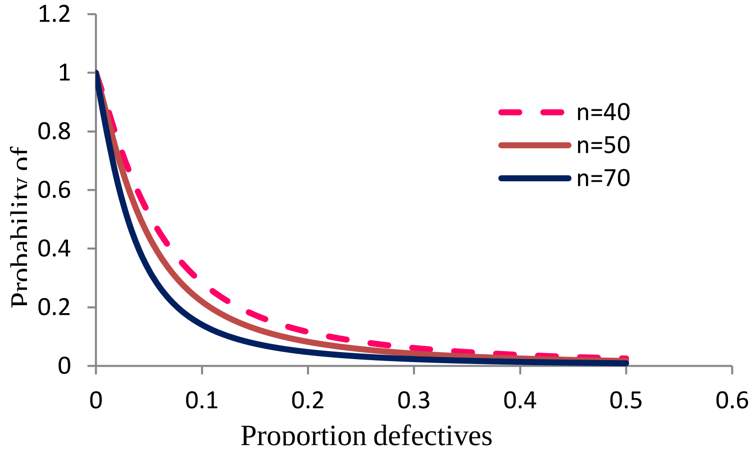
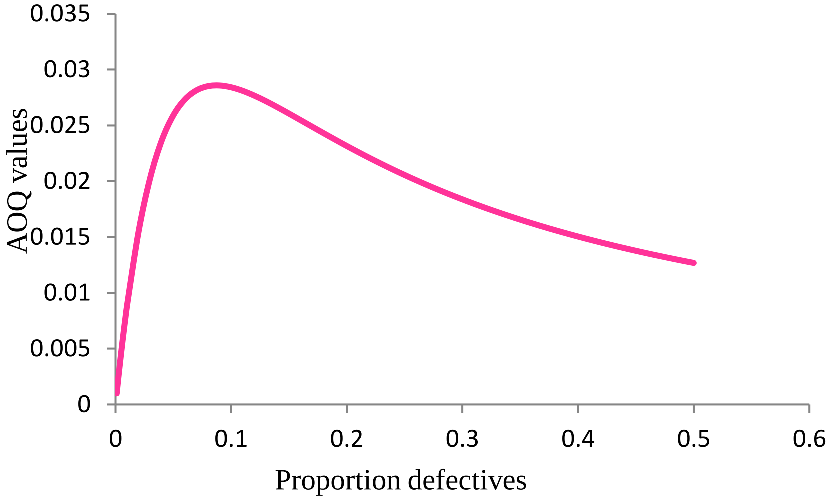


Fig. 2. Average Outgoing Quality Curve for Bayesian SkSP-V with Double Sampling Plan as reference plan with parameters n= 40, i = 1, k = 2, s = 2,f = 1/3, i_{dsp} = 2



9.Conclusion

Bayesian Acceptance Sampling is the approach, which deals with the method in which accord to accept or reject lots or process based on their checking of prehistory or knowledge of samples. There are many way to determine an appropriate sampling plan. However all of them are either settled on a non-economic basis or do not take into consideration the produce's and consumer's quality and risk requirements. Using the Bayesian sampling attribute plan without a cost function for a prior distribution can reduce the sample size. The work presented in this paper mainly related to procedure for designing Bayesian Skip lot Sampling Plan V with Double Sampling Plan as reference plan indexed through relative slopes.

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