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RESEARCH ARTICLE

SELECTION OF BAYESIAN SINGLE SAMPLING PLAN FOR WEIGHTED POISSON DISTRIBUTION BASED ON QUALITY REGIONS

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ABSTRACT

This paper presents a new procedure for the construction and selection of Single Sampling Plan (SSP) using weighted gamma Poisson distribution as a base line distribution. The main theme from this article is to briefly present the theory and technique of (SSP) using Gamma prior distribution and demonstrate how it can facilitate to find Average Quality Level (AQL) and Limiting Quality Level (LQL) bring about the result to reduce the Producer's Risk (α) and Consumer's (β) Risk. In this article, we further designs the parameter of the plan indexed with Probabilistic Quality Region (PQR) and Indifference Quality Regions (IQR) which gives potential application to improve the quality levels in industry products. Tables are constructed for the selection of plan parameters.

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INTRODUCTION

Acceptance Sampling uses sampling procedures to determine whether to accept or reject a product. It has been a common quality control technique that used in industry and particularly in military for contracts and procurement of products. Most often a producer supplies number of items to consumer and decision to accept or reject the lot is made through determining the number of defective items in a sample from the lot. The lot is accepted, if the number of defectives falls below the acceptance number (or) otherwise, the lot is rejected. A sample is taken and contains too many non-conforming items, then the batch is rejected otherwise it is accepted. Bayesian Acceptance sampling approach is associated with utilization of prior process history for the selection of distribution (viz. Gamma Poisson, Beta Binomial) to describe the random fluctuations involved in acceptance sampling. Bayesian sampling plans requires the uses to specify explicit the distribution of defectives from lot-to-lot quality on which the sampling plan is going to operate. The distribution is called prior because it is formulated prior to the taking of samples.

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Bayesian Sampling inspection contains three components:

- The prior distribution (i.e.,) the expected distribution of submitted lots according to quality
- The cost of sampling inspection, acceptance (or) rejection
- A class of sampling plans that usually defined by means of a restriction designed to give a protection against accepting lots of poor quality.

The operating characteristic function is influenced by the plan parameters such as sample size (n), acceptance number (c) and the parameters of prior distribution is p. Analysis of OC function for different values of these parameters can determine range of the protection to both producer and consumer. This paper provides a new procedure for designing attribute single sampling plan indexed through ratios. Also considering the ability of the declination angles of the tangent at the inflection point on the OC curve for discrimination of the Single Sampling Plan (SSP).

Suresh and Latha (2001) has studied Bayesian single sampling plan through Average Probability of Acceptance involving Gamma Poisson model. Latha and Subbiah (2015) have studied the selection of Bayesian Multiple deferred state (BMDS-1) sampling plan based on quality regions. Calvin (1984) has provided procedures and tables for implementing Bayesian Sampling Plans. Hald (1965) has given a rather complete tabulation and discussed the properties of a system of single sampling attribute plans obtained by minimizing average costs are linear with fraction defective p and that the distribution of the quality is a double binomial distribution. Latha and Jeyabharathi (2012) has studied the selection of chain sampling attribute plan based on Geometric distribution.

Bayesian Single Sampling Plan

This paper related to Bayesian single sampling plan for Average probability function of incoming quality level.

Single Sampling Plan (SSP)

A single sampling plan is characterized by sample size n and the acceptance number c. sampling inspection in which the decision to accept or reject or not to accept is based on the inspection of a single sample size n.

Conditions for application of Single Sampling Plan:

- Production is continuous, so that results of the past, present and future lots are broadly the indicative of a continuous process.
- Lots are submitted sequentially.
- Inspection is by attributes, with the lot quality as the level defined as the proportion defective.

Operating Procedure:

Select a random sample of the size n and count the number of non-conforming units d. If there is c (or) less non-conforming units, the lot is accepted, otherwise the lot is rejected. Thus the plan is characterized by two parameters via, the sample size n and the acceptance number c.

The OC function of the single sampling plan is given as

$$P_a(p) = p(d \leq c, n) \qquad (1)$$

The single sampling plan is characterized with sample size n and the ac-ceptance number c. The probability of acceptance of SSP based on weighted Poisson model is provided as

$$P_a(P) = \sum_{x=1}^{c} \frac{e^{-np}(np)^{x-1}}{x-1\,!},\ x = 1,2,3\ldots. \qquad (2)$$

Using the past history of inspection, it is observed that p follows a Beta distribution which is for convince approximated by a Gamma distribution (Hald,1981, pp. 133) with density function w(p)

$$w\ P\ = \frac{e^{-pt} t^s p^{s-1}}{\Gamma(s)}\quad s, t > 0\ and\ p > 0 \qquad (3)$$

Thus, the average probability of acceptance $\bar{P}$ is approximately obtained by

$$\bar{P} = \int_0^1 P_a\ p\ w\ p\ dp$$

$$= \sum_{x=1}^{c} \frac{1}{\beta(x,s-1)} \frac{s^s}{(s-1)} \frac{(n\mu)^{x-1}}{(s+n\mu)^{s+x-1}} \quad x=1,2,3,\ldots.$$

$$= \sum_{x=1}^{c} \binom{s+x-2}{s-1} \left(\frac{n\mu}{s+n\mu}\right)^{x-1} \left(\frac{s}{s+n\mu}\right)^{s} \qquad (4)$$

where $\mu = \frac{s}{t}$ is the first moment of the gamma distribution for the product quality p.

Hence the above equation is Bayesian Single Sampling of Weighted Gamma Poisson distribution.

Selection o bayesian single sampling plan (BSSP)

Designing of quality interval BSSP (QIBSSP):

Quality decision region (QDR)

It is an interval of quality ($\mu_1 < \mu < \mu_*$) in which product is accepted at engineer's quality average. The quality is reliably maintained up to μ_* (MAPD) and sudden decline in quality is expected. This region is also called Reliable Quality Region (RQR). Quality decision range is denoted as $d_1 = (\mu_* - \mu_1$ - $_1)$ is derived from the average probability of acceptance.

$$\bar{P}(\mu_1 < \mu < \mu_*) = \sum_{x=1}^{c} \binom{s+x-2}{s-1} \left(\frac{s}{s+n\mu}\right)^{s} \left(\frac{n\mu}{s+n\mu}\right)^{x-1};\ \mu_1 < \mu < \mu_* \qquad (5)$$

where $\mu = \frac{s}{t}$ the mean value for the product quality p.

Probabilistic Quality Region (PQR)

It is an interval of quality ($\mu_1 < \mu < \mu_2$) in which product is accepted with a minimum probability 0.10 and maximum probability 0.95 probabilistic quality range denotes $d_2 = (\mu_2 - \mu_1)$ is derived from the average probability of acceptance.

$$\bar{P}(\mu_1 < \mu < \mu_2) = \sum_{x=1}^{c} \binom{s+x-2}{s-1} \left(\frac{s}{s+n\mu}\right)^{s} \left(\frac{n\mu}{s+n\mu}\right)^{x-1};\ \mu_1 < \mu < \mu_2 \qquad (6)$$

where $\mu = \frac{s}{t}$ the mean value for the product quality p.

Limiting Quality Region (LQR)

It is an interval of quality ($\mu_* < \mu < \mu_2$) in which product is accepted with a minimum probability 0.10 and maximum probability 0.95. Limiting quality range denoted as $d_3 = (\mu_2 - \mu_*)$ is derived from the average probability of acceptance.

$$\bar{P}(\mu_* < \mu < \mu_2) = \sum_{x=1}^{c} \binom{s+x-2}{s-1} \left(\frac{s}{s+n\mu}\right)^{s} \left(\frac{n\mu}{s+n\mu}\right)^{x-1};\ \mu_* < \mu < \mu_2 \qquad (7)$$

where $\mu = \frac{s}{t}$ the mean value for the product quality p.

Indifference Quality region (IQR)

It is an interval of quality ($\mu_1 < \mu < \mu_0$) in which product is acceptd with a minimum probability 0.50 and maximum probability 0.95. Indifference quality range denoted as $d_0=(\mu_0 - \mu_1)$ is derived from the average probability of acceptance.

$$\bar{P}(\mu_1 < \mu < \mu_0) = \sum_{x=1}^{c} \binom{s+x-2}{s-1} \left(\frac{s}{s+n\mu}\right)^{s} \left(\frac{n\mu}{s+n\mu}\right)^{x-1} ; \quad \mu_1 < \mu < \mu_0 \tag{8}$$

where $\mu = \frac{s}{t}$ the mean value for the product quality p.

Selection of the sample plan

Table 1 shows the value of s ,m and corresponding ranges d_1= nQDR, d_2= nPQR, d_3= nLQR and d_0= nIQR. Define a ratio

$$T=\frac{\mu_*-\mu_1}{\mu_2-\mu_1} = \frac{n\mu_*-n\mu_1}{n\mu_2-n\mu_1} \tag{9}$$

$$T_1=\frac{\mu_*-\mu_1}{\mu_2-\mu_*} = \frac{n\mu_*-n\mu_1}{n\mu_2-n\mu_*} \tag{10}$$

$$T_2=\frac{\mu_*-\mu_1}{\mu_0-\mu_1} = \frac{n\mu_*-n\mu_1}{n\mu_0-n\mu_1} \tag{11}$$

This is used to characterize the sampling plan. For any given values of QDR (d_1), PQR(d_2), LQR (d_3) and IQR (d_0). One can find the ratio $T= \frac{d_1}{d_2}, T_1 = \frac{d_1}{d_3}, and\ T_2 = \frac{d_1}{d_0}$. Find the value in the table (1) under the column T,T_1 and T_2, which is equal to or just less than the specified ratio, corresponding s and c, values are noted, from this ratio, one can determine the parameters for Bayesian single sampling plan.

Numerical Example

Given μ_1=0.01,s = 5 and c = 2 compute the values of QDR,PQR,LQR and IQR. Then compute T, T_1, T_2 select the respective values from table 1. The nearest values are QDR=0.4980, PQR=4.8754, LQR=43774, IQR=1.4623 and the ratio T=0.1022, T_1=0.1138, T_2= 0.3406 with respect to s and c. Corresponding s and c, one can obtain the values of $n\mu_1$ from the table 2, which is $n\mu_1$= 0.3353. From this one can obtain n= $\frac{n\mu_1}{\mu_1}$ = 0.3353 ≈ 33 using table 1. Thus the selected parameters for bayesian single sampling plan are n=33, s=5 and c=2 (Bayesian single sampling plan (33,5,2)) through quality interval.

For specified QDR and PQR

Table (1) is used to construct the plans when the QDR and PQR are specified. For any given values of the QDR(d_1) and PQR(d_2), one can find the ratio, T= $\frac{d_1}{d_2}$ which is a monotonic increasing function. Find the value in Table (1) under the column T which is equal to or just less than the specified ratio. Then the corresponding values of s and c are noted. From this, one determines the parameters n, s and c for the Bayesian Single sampling plan.

Numerical Example: For a company 1 defects are seen in QDR and 9 defects are seen in PQR. Then d_1 =0.01 and d_2 =0.09, $T_1 = \frac{d_1}{d_2}$ = 0.112. Find the ratio taking value 0.112. Select value of T equal to or just less than this ratio using Table 1. The value of T is 0.1123 which is associated with s=6 and c=2. Also nd_1 =0.05188, nd_2 =4.62219, corresponding to s=6 and c=2. Thus n is calculated. The parameters for bayesian single sampling plan (56,6,2).

For specified QDR and LQR

Table 1 is used to construct the plans when the QDR and LQR are specified. For any given values of the QDR (d_1) and LQR (d_3), one can find the ratio $T_1 = \frac{d_1}{d_3}$ which is a monotonic increasing function. Find the value in Table 1 under the column T_1 which is equal to or just less than the specified ratio. Then the corresponding values of s and c are noted. From this, one determines the parameters n, s and c for the Bayesian Single sampling plan.

Numerical Example: For a company 1 percent defects are seen in QDR and 7 percent defects are seen in LQR. Then d_1 =0.01 and d_3= 0.07. T $= \frac{d_1}{d_3}$ = 0.143. Find the ratio taking value 0.143. Select value of T_1 equal to or just less than this ratio using Table 1. The value of T_1 is 0.1554 which is associated with s=4 and c=4. Also nd_1 =1.2366, nd_3 =7.9574 corresponding to s=4 and c=4. Thus n is calculated. The parameter s for the bayesian single sampling plan is (124, 4, 4)

For specified QDR and IQR

Table 1 is used to construct the plans when the QDR and IQR are specified. For any given values of the QDR(d_1) and LQR(d_3), one can nd the ratio $T_1 = \frac{d_1}{d_3}$ which is a monotonic increasing function. Find the value in Table (1) under the column T_1 which is equal to or just less than the specified ratio. Then the corresponding values of s and c are noted. From this, one determines the parameters n, s and c for the Bayesian Single sampling plan.

Numerical Example: For a company 2 percent defects are seen in QDR and 8 percent defects are seen in IQR. Then d_1 =0.02 and d_0= 0.08. $T_2 = \frac{d_1}{d_3}$ = 0.25. Find the ratio taking values 0.25. Select value of T_2 equal to or just less than this ratio using Table 1. The value of T_2 is 0.2662 which is associated with s=2 and c=3. Also nd_1 =0.6716, nd_0 =10.6959 corresponding to s=2 and c=3. Thus n is calculated. The parameter s for the bayesian single sampling plan is (34, 2, 3).

For specified AQL and LQL

Table 2 is used to construct the plans when the AQL= μ_1, LQL= $n\mu_2$ and s are specified. For any given values of the AQL (μ_1) and LQL (μ_2), the OR = $\frac{\mu_2}{\mu_1}$ is calculated. The values of m and $n\mu_1$ corresponding to the specified OR and s are found out. The sample size n is obtained by dividing μ_1 by μ. From this, one can determine the parameters n, s and c for the Bayesian single sampling plan.

Example: It is given that s = 3, at $\alpha = 0.05$, $\mu_1 = 0.2\%$ and $\beta = 0.10$, $\mu_2 = 4\%$. Then the operating ratio OR = $\frac{\mu_2}{\mu_1} = \frac{4}{0.02} = 20$. The value of OR in table 2 nearer to 20 is 19.6040 for $(n\mu_1) = 0.3245$ and hence n is calculated as equal to $\frac{0.3245}{0.002} = 162.25 \approx 162$. The parameter for the Bayesian single sampling plan (162,3,2).

Table 1. Certain values of QDR, PQR, LQR, IQR and Operating characteristic ratio for specified values

s	c	nd_1	nd_2	nd_3	nd_0	$T = \frac{d_1}{d_2}$	$T_1 = \frac{d_1}{d_3}$	$T_2 = \frac{d_1}{d_0}$
	2	0.3536	7.9014	7.5478	1.6869	0.0448	0.0468	0.2096
	3	0.6716	11.3675	10.6959	2.5233	0.0591	0.0628	0.2662
	4	0.9578	14.7776	13.8198	3.3311	0.0648	0.0693	0.2875
2	5	1.2291	18.1698	16.9327	4.1253	0.0677	0.0726	0.2979
	6	1.4923	21.5322	20.0399	4.9121	0.0693	0.0745	0.3038
	7	1.7508	24.8943	23.1435	5.6946	0.0703	0.0756	0.3074
	8	2.0062	28.2510	26.2448	6.4741	0.0710	0.0764	0.3099
	9	2.2593	31.6040	29.3447	7.2517	0.0715	0.0770	0.3116
	2	0.4255	6.0370	5.6115	1.5593	0.0705	0.0758	0.2729
	3	0.7997	8.4634	7.6637	2.2997	0.0945	0.1043	0.3477
	4	1.1329	10.8150	9.6821	3.0019	0.1048	0.1170	0.3477
3	5	1.4458	13.1305	11.6847	3.6849	0.1101	0.1237	0.3924
	6	1.7474	15.4257	13.6783	4.3572	0.1133	0.1277	0.4010
	7	2.0419	17.7084	15.6665	5.0227	0.1153	0.1303	0.4065
	8	2.3317	19.9828	17.6511	5.6838	0.1167	0.1321	0.4102
	9	2.6182	22.2513	19.6331	6.3416	0.1177	0.1334	0.4129
	2	0.4689	5.2818	4.8129	1.4982	0.0888	0.0974	0.3130
	3	0.8766	7.2816	6.4050	2.1899	0.1204	0.1369	0.4003
	4	1.2366	9.1940	7.9574	2.8366	0.1345	0.1554	0.4359
4	5	1.5722	11.0624	9.4902	3.4599	0.1421	0.1657	0.4544
	6	1.8937	12.9054	11.0117	4.0696	0.1467	0.1720	0.4653
	7	2.2061	14.7323	12.5262	4.6705	0.1497	0.1761	0.4723
	8	2.5125	16.5485	14.0360	5.2656	0.1518	0.1790	0.4772
	9	2.8146	18.3570	15.5424	5.8566	0.1533	0.1811	0.4806
	2	0.4980	4.8754	4.3774	1.4623	0.1022	0.1138	0.3406
	3	0.9278	6.6428	5.7150	2.1242	0.1397	0.1623	0.4368
	4	1.3050	8.3136	7.0086	2.7360	0.1570	0.1862	0.4770
5	5	1.6545	9.9342	8.2797	3.3212	0.1665	0.1998	0.4982
	6	1.9876	11.5252	9.5376	3.3212	0.1665	0.1998	0.4982
	7	2.3099	13.0971	10.7872	4.4491	0.1764	0.2141	0.5192
	8	2.6250	14.6560	12.0310	5.0007	0.1791	0.2182	0.5249
	9	2.9349	16.2056	13.2707	5.5472	0.1881	0.2212	0.5291
	2	0.5880	4.6219	4.1031	1.4387	0.1123	0.1265	0.3606
	3	0.9643	6.2431	5.2788	2.0803	0.1145	0.1827	0.4635
	4	1.5334	7.7603	6.4069	2.6681	0.1744	0.2112	0.5073
6	5	1.7121	9.2223	7.5102	3.2263	0.1856	0.2280	0.5307
	6	2.0524	10.6513	8.5989	3.7667	0.1927	0.2387	0.5447
	7	2.3807	12.05887	9.6780	4.2953	0.1974	0.2460	0.5542
	8	2.7006	13.4511	10.7505	4.8157	0.2008	0.2512	0.5608
	9	3.0143	14.8326	11.8183	5.3300	0.2032	0.2551	0.5565
	2	0.5345	4.4489	3.9144	1.4219	0.1201	0.1365	0.3759
	3	0.9916	5.9693	4.9777	2.0488	0.1661	0.1992	0.4840
	4	1.3894	7.3800	5.9906	2.6188	0.1883	0.2319	0.5305
7	5	1.7546	8.7316	6.9770	3.1571	0.2009	0.2515	0.5558
	6	2.0998	10.0471	7.9473	3.6759	0.2090	0.2642	0.5712
	7	2.4317	11.3387	8.9070	4.1817	0.2145	0.2730	0.5815
	8	2.7542	12.6136	9.8594	4.6782	0.2184	0.2793	0.5887
	9	3.0699	13.8764	10.8065	5.1680	0.2212	0.2841	0.5940
	2	0.5467	4.3233	3.7766	1.4094	0.1265	0.1448	0.3879
	3	1.0129	5.7701	4.7572	2.0251	0.1755	0.2129	0.5002
	4	1.4173	7.1025	5.6852	2.5815	0.1995	0.2493	0.5490
8	5	1.7873	8.3724	6.5851	3.1044	0.2135	0.2714	0.5757
	6	2.1357	9.6030	7.4679	3.6062	0.2224	0.2860	0.5922
	7	2.4699	10.8091	8.3392	4.0940	0.2285	0.2962	0.6033
	8	2.7938	11.9962	9.2024	4.5716	0.2329	0.3036	0.6111
	9	3.1104	13.1702	10.0598	5.0420	0.2362	0.3092	0.6169
	2	0.5564	4.2279	3.6715	1.3996	0.1316	0.1515	0.3975
	3	1.0299	5.6186	4.5887	2.0067	0.1833	0.2244	0.5132
	4	1.4173	7.1025	5.6852	2.5815	0.1995	0.2493	0.5490
9	5	1.4395	6.8911	5.4516	2.5523	0.2089	0.2641	0.5640
	6	2.1639	9.2639	7.1000	3.5508	0.2336	0.3048	0.6094
	7	2.4995	10.4025	7.9030	4.0240	0.2403	0.3163	0.6211
	8	2.6867	11.3840	8.6973	4.3489	0.2360	0.3089	0.6178
	9	2.8555	12.3408	9.4853	4.6555	0.2314	0.3010	0.6134

Table 2.

s	c	$\frac{\overline{\mu_2}}{\mu_1}$ α=0.05 β=0.10	$\frac{\overline{\mu_2}}{\mu_2}$ α=0.05 β=0.05	$\frac{\overline{\mu_2}}{\mu_1}$ α=0.01 β=0.10	$\frac{\overline{\mu_2}}{\mu_1}$ α=0.01 β=0.05	$\frac{\overline{\mu_2}}{\mu_1}$ α=0.25 β=0.10	$\frac{\overline{\mu_2}}{\mu_1}$ α=0.25 β=0.05	h_0
	1	83.1654	133.5442	428.1782	687.5545	13.9774	22.4444	0.5858
	2	26.2380	40.8096	65.6110	102.0487	8.4782	13.1866	0.7500
	3	18.1792	27.9423	36.6856	56.3873	7.1662	11.0148	0.8277
	4	15.1792	423.1858	27.7103	42.3265	6.5820	10.0538	0.8733
2	5	13.6334	20.7442	23.4977	35.7534	6.2516	9.5123	0.9034
	6	12.6959	19.2669	21.0816	31.9928	6.0394	9.1652	0.9248
	7	12.0681	18.2791	19.5249	29.5737	5.8915	8.9237	0.9408
	8	11.6187	17.5730	18.4414	27.8922	5.7825	8.7459	0.9532
	9	11.2811	17.0429	17.6433	26.6548	5.6989	8.6097	0.9631
	1	66.6019	98.9096	342.9010	509.2376	11.4717	17.0364	0.6189
	2	19.6040	27.9427	48.3764	68.9536	6.6052	9.4148	0.8277
	3	13.0854	18.3516	25.8569	36.2630	5.4436	7.6343	0.9375
3	4	10.6813	14.8484	19.0032	26.4129	4.9245	6.8457	1.0064
	5	9.4484	13.0613	15.8172	21.8654	4.6301	6.4005	1.0540
	6	8.7028	11.9842	14.0020	19.2814	4.4402	6.1144	1.0888
	7	8.2041	11.2654	12.8367	17.6267	4.3076	5.9150	1.1155
	8	7.8474	10.7523	12.0279	16.4802	4.2097	5.7680	1.1367
	9	7.5797	10.3677	11.4342	15.6398	4.1344	5.6551	1.1538
	1	60.3314	86.4147	308.2277	441.4851	10.4361	14.9480	0.6364
	2	16.9523	23.1824	41.5463	56.8150	5.8389	7.9847	0.8733
	3	11.0658	14.8489	21.6176	29.0081	4.7389	6.3590	1.0064
4	4	8.9027	11.8209	15.6102	20.7271	4.2454	5.6369	1.0938
	5	7.7959	1.2812	12.8339	16.9254	3.9646	5.2285	1.1560
	6	7.1270	9.3546	11.2574	14.7759	3.7829	4.9652	1.2028
	7	6.6796	8.7365	10.2473	13.4029	3.6558	4.7815	1.2393
	8	6.3598	8.2960	9.5469	12.4533	3.5617	4.6460	1.2686
	9	6.1199	7.9656	9.0339	11.7584	3.4892	4.5415	1.2927
	1	56.6764	79.5116	289.5545	406.2178	9.8767	13.8561	0.6472
	2	15.5404	20.7459	37.8960	50.5898	5.4244	7.2414	0.9034
	3	9.9901	13.0620	2.1833	2.8546	4.3573	5.6971	1.0540
5	4	7.9570	10.2817	13.8206	17.8584	3.8771	5.0098	1.1560
	5	6.9174	8.8701	11.2627	14.4421	3.6029	4.6200	1.2305
	6	6.2890	8.0207	9.8126	12.5146	3.4252	4.3684	1.2875
	7	5.8686	7.4544	8.8847	11.2854	3.3005	4.1923	1.3328
	8	5.5682	7.0506	8.2419	10.4362	3.2080	4.0621	1.3696
	9	5.3426	6.7481	7.7717	9.8162	3.1366	3.9618	1.4001
	1	54.5010	75.4427	277.9010	384.6832	9.5243	13.1839	0.6546
	2	14.6621	19.2678	35.6592	46.8605	5.1653	6.7878	0.9248
	3	9.3241	11.9845	17.9910	23.1243	4.1184	5.2935	1.0888
	4	7.3713	9.3549	12.7189	16.1415	3.6460	4.6271	1.2028
6	5	6.3727	8.0203	10.2953	12.9571	3.3758	4.2485	1.2875
	6	5.7693	7.2179	8.9229	11.1633	3.2000	4.0035	1.3535
	7	5.3656	6.6830	8.0461	10.0217	3.0765	3.8318	1.4065
	8	5.0768	6.3014	7.4387	9.2331	2.9847	3.7047	1.4501
	9	4.8598	6.0154	6.9943	8.6573	2.9138	3.6067	1.4865
	1	52.9417	72.6000	269.9505	370.1881	9.2833	12.7303	0.6599
	2	14.0658	18.2805	34.1125	44.3340	4.9879	6.4825	0.9408
	3	8.8709	11.2648	17.0537	21.6558	3.9549	5.0222	1.1155
	4	6.9728	8.7364	11.9728	15.0010	3.4877	4.3698	1.2393
7	5	6.0026	7.4543	9.6402	11.9717	3.2196	3.9983	1.3328
	6	5.4159	6.6831	8.3214	10.2684	3.0451	3.7576	1.4065
	7	5.0232	6.1690	7.4782	9.1839	2.9222	3.5887	1.4663
	8	4.7420	5.8019	6.8946	8.4355	2.8308	3.4634	1.5159
	9	4.5308	5.5267	6.4676	7.8892	2.7601	3.3668	1.5579
	1	51.8097	70.5573	264.1782	359.7723	9.1096	12.4059	0.6640
	2	13.6338	17.5739	33.0184	42.5605	4.8589	6.2631	0.9532
	3	8.5436	10.7516	16.3784	20.6113	3.8358	4.8271	1.1367
	4	6.6847	8.2955	11.4347	14.1900	3.3722	4.1848	1.2686
8	5	5.7347	7.0506	9.1680	11.2717	3.1057	3.8183	1.3696
	6	5.1597	6.3014	7.8869	9.6319	2.9320	3.5807	1.4501
	7	4.7749	5.8019	7.0681	8.5883	2.8093	3.4136	1.5159
	8	4.4991	5.4451	6.5017	7.8688	2.7180	3.2895	1.5710
	9	4.2920	5.1778	5.9679	7.1996	2.6473	3.1937	1.6179
	1	51.0486	69.1556	259.7921	351.9406	8.9767	12.1608	0.6671
	2	13.3047	17.0416	32.1710	41.2069	4.7610	6.0982	0.9631
	3	8.2959	10.3674	15.8686	19.8308	3.7453	4.6804	1.1538
	4	6.4670	7.9656	11.0291	13.5849	3.2843	4.0454	1.2927
9	5	5.5316	6.7479	7.5342	9.1909	3.0189	3.6828	1.4001
	6	4.9655	6.0153	5.6289	6.8189	2.8456	3.4472	1.4865
	7	4.5865	5.5267	4.7540	5.7285	2.7231	3.2814	1.5579
	8	4.1506	4.9807	4.2511	5.1013	2.6318	3.1581	1.6179
	9	3.8406	4.5931	3.9244	4.6934	2.5610	3.0628	1.6692

Construction of Tables

The probability of acceptance of SSP based on weighted Poisson model is provided as

$$P_a(P) = \sum_{x=1}^{c} \frac{e^{-np}(np)^{x-1}}{x-1\,!}, \; x = 1,2,3\ldots.$$

$$w\; P \;=\; \frac{e^{-pt}t^{s}p^{s-1}}{\Gamma(s)} \quad s,t > 0 \; and \; p > 0$$

Thus, the average probability of acceptance P is approximately obtained by

$$\bar{P} = \int_{0}^{1} P_a\; p\; w\; p\; dp$$

$$\sum_{x=1}^{c} \binom{s+x-2}{s-1} \left(\frac{n\mu}{s+n\mu}\right)^{x-1} \left(\frac{s}{s+n\mu}\right)^{s}$$

Where $\mu = \frac{s}{t}$ the mean value for the product quality p.

Table 1 shows the value of s and c corresponding ranges d_1= nQDR, d_2= nPQR, d_3= nLQR and d_0= nIQR from equation 5,6,7,and 8 and also represents operating characteristic ratio for specified values of s and c. Table 2 represents the conversion table, which is used to determine other quality characteristics.

Conclusion

Bayesian acceptance sampling is the technique, which deals with the producers in which decision to accept or reject lots or process based on their examination of past history or knowledge of samples. This paper deal with sampling model based on prior distribution and costs, which encompasses most of the existing Bayesian models based on costs. The work is presented in this paper mainly related to construction and selection Bayesian single sampling plan (BSSP) for Quality regions. Quality Interval Sampling (QIS) plan possesses wider potential applicability in industry ensuring higher standard of quality attainment for product or process. Thus Quality Interval Sampling (QIS) plan is a good measure for defining quality and designing any acceptance sampling plan which are readymade use to industrial shop floor situations. The Quality Decision Region (QDR) idea is proposed in order to provide higher probability of acceptance compared with (AQL, LQL) indexed plan scheme. Quality Decision Region (QDR) depends on the quality on the quality measure MAPD, which is a key measure assessing to what degree the inflation point empowers the OC curve to discriminate between good and bad lots. The present development would be a valuable addition to the literature and a useful device for quality control practitioners. This paper mainly relates to the construction and selection of performance measures for Quality Interval Sampling (QIS) inspection plan indexed through quality regions.

REFERENCES

Calvin, T.W. 1984. How and when do perform Bayesian Acceptance Sampling Vol.7, American Society for Quality Control.

Hald, A 1981. Statistical Theory of sampling Inspection by Attributes, Academic Press London.

Latha, M and Jeyabharathi, S 2012. Selection of bayesian chain sampling attributes plans based on geometric distribution, *International Journal of Scientific and Research Publication*, vol.2,Issue 7, pp.1-8.

Latha, M and Subbiah, K. 2015. Selection of Bayesian multiple deferred state (BMDS-1) sampling plan based on quality regions, *International Journal of Recent Scientific Research*, Vol.6, Issue 4, pp.275-282.

Lauer, N.G. 1978. Acceptance probabilities for sampling plans where the proportion defective has a beta distribution, *Journal of Quality Technology*, Vol.3, Issue 4, pp. 275-282.

Mayer, P.L. 1967. A note on sum of Poisson probabilities and an application, Annals of institute of statistical Mathematics, Vol. 19,pp. 537-542.

Suresh, K.K. and Latha, M 2001. Bayesian single sampling plans for a Gamma Prior, Economic Quality Control, Vol.16, No.1, pp. 93-107.

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