EVALUATION OF REPETITIVE DEFERRED SAMPLING PLAN FOR TRUNCATED LIFE TESTS BASED ON PERCENTILES USING KUMARASWAMY EXPONENTIATED RAYLEIGH DISTRIBUTION

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Abstract

This paper focuses on the designing of the Repetitive Deferred sampling plan for truncated life test for percentiles using Kumaraswamy Exponentiated Rayleigh distribution. A truncated life test may be conducted to evaluate the smallest sample size to insure certain percentile life time of products. The main objective of the proposed sampling plan is to minimize the sample size because the analogous inspection time and inspection cost will be reduced. The operating characteristic function values are calculated according to various quality levels and the minimum ratios of the true average life to the specified average life at the specified producer's risk are derived. Certain real life examples are provided.

Keywords: Kumaraswamy Exponentiated Rayleigh Distribution, Repetitive Deferred Sampling Plan (RDS), Percentiles, life test, Producer's risk.

1. Introduction

A most commonly used technique in quality control is the Acceptance Sampling Plan. The acceptance sampling plans relates with the acceptance or rejection of a large-sized lot of products on the basis of quality of the products in a sample taken from the lot. Reliability sampling plans are the inspection techniques which are embraced for taking decisions on the disposition of the lot of an item based on assessment of the quality using the lifetimes of an items as quality variables. A life test is the process of estimating the life time of the product through experiments. A reliability sampling plan is also termed as the life test sampling plan for making decision about the disposition of lots based on the information obtained from a life test.

Many authors studied the designing of acceptance sampling plans based on the life test. Truncated life tests for the exponential distribution was first introduced by Epstein [4]. Further, truncated life tests were considered by many authors using various distributions. Gupta and Groll [5] developed the reliability acceptance sampling under the gamma distribution. Acceptance Sampling for the truncated life test based on the half logistic distribution was developed by Kantam and Rosaiah [8]. Baklizi and EI Masri [1] further designed reliability acceptance plan assuming the life time distribtion follows Birnbaum-Saunders distribution. Wu and Tsai [15] introduced the acceptance sampling truncated life test plan assuring mean lifetime under Birnbaum-Saunders distribution, which is outlined as an algorithm to obtain the plans. Balakrishnan et al. [2] developed the reliability acceptance sampling for generalized Birnbaum-Saunders distribution.

Percentiles bring more information about a life distribution than the mean life. When the life distribution is symmetric, the 50^{th} percentile or the median is equivalent to the mean life. Hence, developing acceptance sampling plans based on percentiles of a life distribution can be served as a generalization of the developing acceptance sampling plans based on the mean life of items. Lio .et.al [9] studied acceptance sampling for generalized Birnbaum-Saunders distribution using percentiles. Rosaiah et al. [13] developed an acceptance sampling procedure for the inverse Rayleigh distribution percentile under a truncated life test. Pradeepa Veera Kumari and Ponneswari [12] proposed the designing of acceptance sampling plan for life tests based on Percentiles of Exponentiated Rayleigh Distribution. Jayalakshmi and Neena Krishna [6] studied the designing of Special Type Double Sampling Plan for life tests based on percentiles using Exponentiated Frechet Distribution. Jayalakshmi and Vijilamery [7] developed Special Double Sampling Plan for truncated life tests based on percentile using Gompertz Frechet Distribution.

Lord Rayleigh [10] derived the Rayleigh distribution on the resultant of a large number of vibrations of the same pitch and of arbitrary phase. Kundu et al. [3] gave different methods and estimations of Generalized Rayleigh distribution. Nasr Ibrahim Rashwan [11] developed the Kumaraswamy Exponentiated Rayleigh Distribution. Shankar and Mohapatra [14] was first introduced the Repetitive Deferred Sampling Plan. This paper presents the idea of Repetitive Deferred Sampling Plans using Kumaraswamy Exponentiated Rayleigh Distribution, when the life test is truncated at a pre specified time. The main objective of the proposed sampling plan is to minimize the sample size because the analogous inspection time and inspection cost will be reduced.

2. Kumaraswamy Exponentiated Rayleigh Distribution

Nasr Ibrahim Rashwan(2016) defined the Cumulative Distribution Function(CDF) and Probability Density Function(PDF) of Kumaraswamy Exponentiated Rayleigh distribution.
The CDF of Kumaraswamy Exponentiated Rayleigh Distribution is given by

$$F(t,\lambda,\theta,a,b) = 1 - \left[1 - \left(1 - e^{-(\lambda t)^2}\right)\right)^{\theta a^b} \tag{1}$$

And the corresponding PDF is given by

$$f(t,\lambda,\theta,a,b) = 2ab\theta\lambda^2 t e^{-(\lambda t)^2}\left[1 - e^{-(\lambda t)^2}\right]^{\theta a-1}\left[1 - e^{-(\lambda t)^2}\right]^{b-1}, t,\lambda,\theta,a,b > 0 \tag{2}$$

Where λ is the scale parameter and θ, a, b are the shape parameters.
The hazard function of the distribution is given by

$$H(t) = \frac{f(t)}{1 - F(t)} \tag{3}$$

The percentile or the q^{th} quantile of any distribution is given by,

$$p_r\left(T \leq_{tq}\right) = q \tag{4}$$

$$t_q = \frac{1}{\lambda}\left[-\ln\left[1 - \left(1 - (1-q)^{1/b}\right)^{1/\theta a}\right]\right]^{1/2} \tag{5}$$

t_q and q are directly proportional. Let

$$\eta_q = \left[-\ln\left[1 - \left(1 - (1-q)^{1/b}\right)^{1/\theta a}\right]\right]^{1/2} \tag{6}$$

By changing the scale parameter $\lambda = \frac{\eta_q}{t_q}$, then the cumulative distribution function can be written in the form

$$F(t) = 1 - \left[1 - \left(1 - e^{-\left(\eta_q t/tq\right)^2}\right)^{\theta a}\right]^b \tag{7}$$

Let, $\delta_q = t/tq$

$$F(t) = 1 - \left[1 - \left(1 - e^{-\left(\eta_q \delta q\right)^2}\right)^{\theta a}\right]^b \tag{8}$$

Taking partial derivative with respect to δ, we have

$$\frac{\partial F(t)}{\partial \delta} = b\left[1 - \left(1 - e^{-\left(\eta_q \delta_q\right)^2}\right)^{\theta a}\right]^{b-1} \theta a \left(1 - e^{-\left(\eta_q \delta_q\right)^2}\right)^2 \theta a - 1_e^{-\left(\eta_q \delta_q\right)^2} {}_{2\eta_q \delta_q} \tag{9}$$

Since $\frac{\partial F}{\partial \delta_q} > 0, F\left(t, \delta_q\right)$ is a non-decreasing function of δ_q.

3. Formation of Repetitive Deferred Sampling Plan Using Kumaraswamy Exponentiated Rayleigh Distribution

The Repetitive Deferred Sampling Plan is represented as $(n, c_1, c_2, i, t/t_q^0)$ Here, the sample size be denoted as n, $c_j, j = 1, 2$ represents the acceptance number and i denotes the preceeding or succeeding lots can be taken. In life testing study, the test that will terminate at a pre-determined time t. The probability of rejecting a bad lot is P* and the maximum number of allowable defectives are c_1 and c_2. The RDS plan for percentiles is considered to obtain the minimum sample size "n" for the specified acceptance numbers c_1 and c_2 such that the consumer's risk (probability of accepting the bad lot) does not exceed $1 - P^*$.

A bad lot means that the true 100qth percentile t_q^0 is below the specified percentile. Hence, the probability P^* is a minimum confidence level in the sense that lot of true average life below the specified life is rejected by the proposed sampling plan.

3.1. Operating Procedure

Shankar and Mohapatra (1991) developed Repetitive Deferred Sampling Plan indexed through producer and consumer quality levels. The operating characteristic function of the Repetitive Deferred Sampling plan under the truncated life test can be given as follows:

- Select a random sample of n units and count the number of defectives, then put on the test for pre-assigned experimental time t_0.
- Accept the lot if $d \leq c_1$,
- Reject the lot if $d > c_2$.
- If $c_1 < d < c_2$, if , accept the current lot provided
  - i Immediately preceding i lots are accepted in the case of deferred sampling or
  - ii Succeeding i lots are accepted in the case of deferred sampling plan.

3.2. Operating Characteristic Function

Let us represent the Repetitive Deferred Sampling Plan under Kumaraswamy Exponentiated Rayleigh Distribution as $n, c_1, c_2, i, \frac{t}{t_q^0}, j = 1, 2$. Here, the sample size be denoted as $n, c_j, j = 1, 2$ represents the acceptance number and i denotes the preceeding or succeeding lots.

For the proposed Repetitive Deferred Sampling Plan, the probability of acceptance of lot is given by

$$L(p) = \frac{p_a\left(1 - p_C\right)^i + p_c p_a^i}{\left(1 - p_C\right)^i} \tag{10}$$

$$\text{where, } p_a = p\left(d \leq_{c1}\right) = \sum_{x=0}^{c1} \binom{n}{x} p^x (1-p)^{n-x}$$

$$p_c = p\left(_{c1} < d <_{c2}\right) = \sum_{x=0}^{c2} \binom{n}{x}^x (1-p)^{n-x} - \sum_{x=0}^{c1} \binom{n}{x}^x (1-p)^{n-x}$$

Where, p is the failure probability before the time t, given a specified $100q$ th percentile life time ${t_q}^0$, is obtained from the equation $p = F(t,\delta) = 1 - \left[1 - \left(1 - e^{-\left(\eta_q \delta q\right)^2}\right)^{\theta a}\right]^b$

Where $F(t:\delta) \leq F\left(t, \delta_q\right) \Leftrightarrow t_q \geq t_q^0$.

3.3. Minimum Sample Size

In Repetitive Deferred Sampling Plan, to determine the minimum sample size 'n' for the known $P^*, c_1, c_2, i, \frac{t}{t_q^0}$ should be satisfy the following condition,

$$L(p) \leq 1 - P^* \tag{11}$$

Here, $L(p)$ is taken from the equation (10) and where $P^* = 0.99, 0.95, 0.90$ and 0.75 is the probability of rejecting the bad lot. Thus the smallest sample size ' n ' can be simulated using the search procedure for various values of P^*, c_1, c_2, i and $\frac{t}{t_q^0}$ are calculated. Since $\frac{\partial F\left(t,\delta_q\right)}{\partial \delta_q} > 0, F\left(t, \delta_q\right)$ is a non-decreasing function of δ_q with respect to the time t. So $F\left(t, \delta_q\right) \leq F\left(t, \delta_q^0\right) \Leftrightarrow \boldsymbol{t}_q \geq \boldsymbol{t}_q^0$ or equivalently $F\left(t, \delta_q\right) \leq F\left(t, \delta_q^0\right) \Leftrightarrow \delta_q < \delta_q^0$.

4. Numerical Example

Suppose a quality engineer examines the lifetime of an Air Conditioner and the engineer works with the Repetitive Deferred Sampling Plan for the lifetime of the product. Assume that the lifetime of the product follows Kumaraswamy Exponentiated Rayleigh distribution with $\theta = 2, a = 1, b = 0.5, \alpha = 0.05, \beta = 0.10$. The engineer is interested to adopt the sampling plan to insure 10^{th} percentile that the lifetime is at least 650 hours with the confidence level P^* =0.99. The experimenter wants to breaks the experiment at t = 1300 hours. From table 2.3.1,one can obtain the required sample size corresponding to the values of $P^* = 0.99$, $\frac{t}{t_q^0} = 2.00$ and $c_1 = 0, c_2 = 2, i = 1$ is $n = 6$. Thus we have to put the test upto 6 units. The corresponding operating characteristic value $L(p)$ with a confidence level 0.99 for the Repetitive Deferred Sampling Plan ($n = 6, c_1 = 0, c_2 = 2, i = 1, \frac{t}{t_q^0} = 2.00$) under Kumaraswamy Exponentiated Rayleigh Distribution from Table 2 is given as,

$\frac{t_q}{t_q^0}$	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75
$L(P)$	0.00922	0.59769	0.88879	0.97103	0.99164	0.99730	0.99877	0.99902

This shows that the true 10^{th} percentile is equal to the required 10^{th} percentile ($\frac{t_q}{t_q^0}$ =1.00),the producer's risk is approximately 0.99078 (1-0.00922). The producer's risk is almost equal to 0.05 or less when the actual 10^{th} percentile is greater than or approximately equal to 2.00 times the specified 10^{th} percentile. Table 3 gives the values of $d_{0.10}$ for $c_1 = 0$ and $c_2 = 2, i = 1$ and $\frac{t_q}{t_q^0}$ to guarantee that the producer's risk is less than or equals 0.05. In this illustration, the corresponding value of $d_{0.10}$ is 1.93421 for $c_1 = 0, c_2 = 2; t/t_{0.10} = 2.00$ and $\alpha = 0.05$. This means that the product can have a 10^{th} percentile life of 1.93421 times the required 10^{th} percentile lifetime under the above Repetitive Deferred Sampling Plan the product is accepted with probability of at least 0.95. Figure

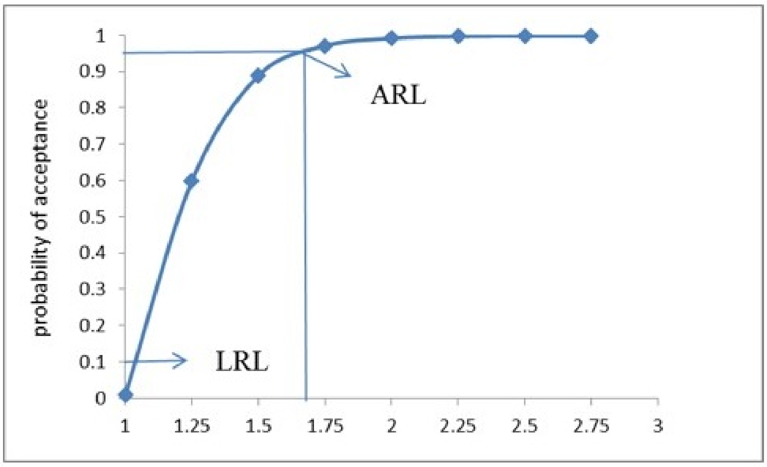

Figure 1: *Operating Characteristic Curve of RDS Plan for 10th Percentile under Kumaraswamy Exponentiated Rayleigh Distribution*

1 represents the operating characteristic curve of RDS plan under Kumaraswamy Exponentiated Rayleigh Distribution for the 10^{th} percentile $(n = 6, c_1 = 0, c_2 = 2, i = 1, t/t_{0.10} = 2.00)$. From figure 1, it is clear that the Repetitive Deferred Sampling Plan attains ARL when the actual 10^{th} life time percentile is 2.00 times greater than required 10^{th} percentile and attains LRL when the actual 10^{th} life time percentile is 1.00 times greater than required 10^{th} percentile.

Table 1: *Minimum Sample Size values 'n'for the 10^{th} percentile of Repetitive Deferred Sampling Plan under Kumaraswamy Exponentiated Rayleigh Distribution when $\theta = 2, a = 1, b = 0.5$*

P*	i	c_1	c_2	$\frac{t}{t_q^0}$							
				0.80	0.85	0.90	1.00	1.50	2.00	2.50	3.00
0.99	1	0	1	97	79	65	48	13	6	4	3
		0	2	97	79	65	46	13	6	4	3
		1	2	136	113	97	67	19	9	6	4
		2	3	179	146	121	88	24	7	5	4
		3	4	209	169	140	101	29	14	9	7
	2	0	1	96	78	64	46	13	6	4	3
		0	2	94	76	63	44	13	6	4	3
		1	2	135	112	95	65	19	9	6	3
		2	3	176	142	117	85	24	7	5	4
		3	4	207	167	138	98	29	14	9	7
0.95	1	0	1	64	52	43	30	9	4	3	2
		0	2	69	55	46	32	11	5	3	3
		1	2	99	81	67	47	14	7	5	3
		2	3	131	107	88	62	19	10	6	5
		3	4	161	131	108	77	23	12	8	6
	2	0	1	64	52	43	30	9	4	3	2
		0	2	62	50	42	29	9	4	3	3
		1	2	97	79	65	46	14	7	4	3
		2	3	130	105	87	61	19	9	6	5
		3	4	160	129	107	76	23	12	8	6
0.90	1	0	1	52	42	35	25	7	4	2	2
		0	2	58	47	39	28	8	4	3	3
		1	2	84	68	56	40	12	6	4	3
		2	3	113	92	76	54	16	8	6	4
		3	4	141	114	94	67	21	11	7	6
	2	0	1	48	39	32	23	7	3	2	2
		0	2	50	41	34	24	7	4	3	3
		1	2	80	65	54	38	12	6	4	3
		2	3	110	89	74	52	16	8	5	4
		3	4	138	112	92	66	20	10	7	5
0.75	1	0	1	36	29	24	17	5	3	2	2
		0	2	44	36	30	21	7	4	3	3
		1	2	63	51	42	30	9	5	3	3
		2	3	88	71	59	42	13	7	5	4
		3	4	112	91	75	54	17	9	6	5
	2	0	1	32	26	21	15	5	3	2	2
		0	2	37	30	25	18	6	3	3	3
		1	2	58	47	39	28	9	5	3	3
		2	3	83	68	56	41	12	7	5	4
		3	4	108	88	72	52	16	9	6	5

Table 2: *Operating Characteristic value for the 10^{th} percentile of Repetitive Deferred Sampling Plan under the assumption of Kumaraswamy Exponentiated Rayleigh Distribution for $\theta = 2, a = 1, b = 0.5, c_1 = 0, c_2 = 2, i = 1$*

P*	n	$\frac{t}{t_q^0}$	$\frac{t_q}{t_q^0}$							
			1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75
0.99	97	0.8	0.00962	0.76963	0.95633	0.99083	0.99771	0.99934	0.99994	0.99998
	79	0.85	0.00941	0.75872	0.95334	0.99011	0.99752	0.99928	0.99991	0.99995
	65	0.9	0.00943	0.75034	0.95083	0.98948	0.99735	0.99923	0.99959	0.99987
	46	1	0.00913	0.72892	0.94438	0.98787	0.99691	0.99909	0.99912	0.99937
	13	1.5	0.00963	0.65500	0.91598	0.97982	0.99451	0.99831	0.99987	0.99992
	6	2	0.00922	0.59769	0.88879	0.97103	0.99164	0.99730	0.99877	0.99902
	4	2.5	0.00395	0.43613	0.80623	0.94470	0.98324	0.99439	0.99564	0.99875
	3	3	0.00173	0.32259	0.72661	0.91639	0.97384	0.99101	0.99354	0.99547
0.99	69	0.8	0.04819	0.52216	0.91156	0.98477	0.99681	0.99920	0.99968	0.99997
	55	0.85	0.05197	0.53085	0.91277	0.98482	0.99679	0.99919	0.99954	0.99978
	46	0.9	0.04871	0.51023	0.90502	0.98321	0.99642	0.99909	0.99925	0.99945
	32	1	0.05142	0.50819	0.90139	0.98213	0.99613	0.99900	0.99921	0.99938
	11	1.5	0.02296	0.29891	0.77796	0.95137	0.98849	0.99686	0.99885	0.99955
	5	2	0.02571	0.29724	0.76262	0.94358	0.98571	0.99588	0.99774	0.99798
	3	2.5	0.02802	0.32259	0.78254	0.94798	0.98638	0.99592	0.99755	0.99787
	3	3	0.00173	0.04774	0.32259	0.72661	0.91639	0.97384	0.98458	0.98652
0.90	58	0.8	0.09622	0.66684	0.94771	0.99114	0.99814	0.99953	0.99978	0.99991
	47	0.85	0.09692	0.66223	0.94588	0.99072	0.99803	0.99950	0.99965	0.99987
	39	0.9	0.09440	0.65072	0.94247	0.99001	0.99787	0.99945	0.99955	0.99975
	28	1	0.08826	0.62454	0.93441	0.98831	0.99746	0.99934	0.99945	0.99965
	8	1.5	0.09724	0.60083	0.91870	0.98378	0.99618	0.99895	0.99912	0.99954
	4	2	0.08272	0.54909	0.89646	0.97763	0.99439	0.99837	0.99901	0.99921
	3	2.5	0.02802	0.32259	0.78254	0.94798	0.98638	0.99592	0.99874	0.99892
	3	3	0.00173	0.04774	0.32259	0.72661	0.91639	0.97384	0.98456	0.98974
0.75	44	0.8	0.24151	0.83647	0.97783	0.99626	0.99921	0.99980	0.99989	0.99992
	36	0.85	0.23688	0.82978	0.97643	0.99598	0.99914	0.99978	0.99989	0.99991
	30	0.9	0.22993	0.82123	0.97469	0.99564	0.99906	0.99976	0.99989	0.99990
	21	1	0.23734	0.81955	0.97360	0.99534	0.99898	0.99973	0.99985	0.99989
	7	1.5	0.16445	0.71826	0.94902	0.98997	0.99763	0.99935	0.99954	0.99987
	4	2	0.08272	0.54909	0.89646	0.97763	0.99439	0.99837	0.99885	0.99921
	3	2.5	0.02802	0.32259	0.78254	0.94798	0.98638	0.99592	0.99745	0.99865
	3	3	0.00173	0.04774	0.32259	0.72661	0.91639	0.97384	0.98254	0.98578

Table 3: *The ratio $d_{0.10}$ for accepting the lot with the producer's risk of 0.05 when $\theta = 2, a = 1, b = 0.5$*

P*	i	c_1	c_2	$\frac{t}{t_q^0}$							
				0.80	0.85	0.90	1.00	1.50	2.00	2.50	3.00
0.99	1	0	1	2.14911	2.16170	2.16758	2.20685	2.35443	2.49349	2.73476	2.96066
		0	2	1.76254	1.77179	1.78171	1.80171	1.87442	1.93421	2.06504	2.15984
		1	2	1.84268	1.85210	1.86341	1.88323	2.00143	2.10385	2.28006	2.30653
		2	3	1.69322	1.70460	1.71002	1.73359	1.82091	1.97192	1.66703	1.74091
		3	4	1.60473	1.60901	1.61803	1.63569	1.71425	1.78578	1.87400	1.98824
	2	0	1	2.18777	2.20348	2.21590	2.24439	2.41161	2.55693	2.81052	3.05413
		0	2	1.79778	1.80595	1.81777	1.83256	1.93704	2.00521	2.14501	2.25000
		1	2	1.85840	1.87156	1.88244	1.90351	2.02437	2.13583	2.31224	2.42538
		2	3	1.70666	1.71258	1.72297	1.73652	1.83405	1.98919	2.18927	2.36513
		3	4	1.61016	1.62090	1.62673	1.63886	2.29936	2.49900	2.88681	3.00250
0.95	1	0	1	1.93524	1.94877	1.96188	1.97880	2.11514	2.18779	2.46423	2.51298
		0	2	1.60939	1.60587	1.61867	1.62820	1.78207	1.80969	1.97759	2.15984
		1	2	1.69354	1.70295	1.71634	1.72783	1.82410	1.92950	2.11791	2.38377
		2	3	1.57579	1.58263	1.58879	1.60337	1.69220	1.81089	1.83545	2.00250
		3	4	1.50111	1.50625	1.51297	1.52802	1.59270	1.68852	1.77204	1.82271
	2	0	1	1.97824	1.99251	2.00767	2.02425	2.16669	2.24788	2.54396	2.60143
		0	2	1.60919	1.61264	1.62608	1.63119	1.72467	1.74510	1.87613	2.25001
		1	2	1.70172	1.71237	1.71755	1.73616	1.84588	1.95395	1.99628	2.02538
		2	3	1.57862	1.58634	1.59478	1.60693	1.70478	1.75715	1.85193	2.02947
		3	4	1.50172	1.50762	1.51632	1.52946	2.13344	2.29875	2.78604	2.83418
0.90	1	0	1	1.83432	1.84119	1.85660	1.88370	1.95998	2.18779	2.29473	2.51298
		0	2	1.53381	1.53780	1.54805	1.56558	1.60653	1.65345	1.79759	2.15984
		1	2	1.61879	1.62752	1.63153	1.65387	1.73680	1.82329	1.92689	1.98377
		2	3	1.51205	1.51879	1.52699	1.54081	1.60054	1.66208	1.83545	1.94091
		3	4	1.44662	1.45026	1.45627	1.46985	1.54535	1.62897	1.65824	1.82271
	2	0	1	1.83703	1.84768	1.85509	1.88492	2.01392	2.03596	2.16784	2.60143
		0	2	1.51745	1.52552	1.53482	1.54489	1.58856	1.71510	1.87613	2.25001
		1	2	1.61695	1.62202	1.63318	.64842	1.75733	1.84732	1.95628	2.02538
		2	3	1.51228	1.51561	1.52606	1.53498	1.61286	1.68053	1.68927	1.76513
		3	4	1.44564	1.45019	1.45457	1.47070	2.03666	2.17876	2.26193	2.61080
0.75	1	0	1	1.66288	1.66714	1.67397	1.69320	1.76599	1.97404	2.09473	2.51298
		0	2	1.42197	1.43068	1.43966	1.44238	1.53317	1.65345	1.79759	2.15984
		1	2	1.50037	1.50308	1.50922	1.52493	1.57901	1.69845	1.72046	1.98377
		2	3	1.41260	1.41566	1.42327	1.43368	1.49288	1.57192	1.66703	1.74091
		3	4	1.35853	1.36143	1.36425	1.38090	1.43839	1.49635	1.51606	1.58734
	2	0	1	1.64897	1.65667	1.65257	1.67466	1.81167	2.03596	2.16784	2.60143
		0	2	1.39634	1.40072	1.40874	1.42238	1.50587	1.54877	1.87613	2.25001
		1	2	1.48019	1.48605	1.49501	1.51223	1.60207	1.72367	1.78685	2.02538
		2	3	1.39977	1.40836	1.40980	1.43346	1.46418	1.58919	1.68927	1.76513
		3	4	1.35150	1.35537	1.35564	1.37274	1.88807	1.91080	1.93254	1.96080

5. Conclusion

This study establishes the designing of Repetitive Deferred sampling plan for the truncated life test when the life time of the product follows Kumaraswamy Exponentiated Rayleigh Distribution. The work designed and developed with the aim that sampling plan in this paper may helpful for the engineers and statistical plan developers in the field of statistical quality control especially in attribute reliability sampling plan. The results from the sampling plan developed in this article can easily adaptable in practical situation with small sample sizes and fewer experimental times and hence the plan yields a better result for reliability sampling plan. The tables are generated which is useful for both producer and consumer. This plan can highly recommendable since the products are randomly sampled and also the procedure for sampling involves less experiment time and with minimum sample size.

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