Study on Acceptance Sampling Plan For Truncate Life Tests Based on Percentiles Using Gompertz Frechet Distribution

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Abstract

In this paper, Acceptance Sampling approaches useful for minimizing the cost and time of the submitted lots. In this busy world expect the Quality assurance and reliability of the product is very high. So, use the truncated life tests in acceptance sampling plan. Time truncated life tests in sampling plan are used to certain reach a decision on the product. Therefore, Gompertz Frechet Distribution is considered as model for a life time random variable when the lifetime test is truncated at pre-determined time. The operating characteristic functions of the sampling plans and Producer's risk is also discussed. The results are illustrated by an example.

Keywords: Gompertz Frechet Distribution, Single Sampling Plan, truncated life time test, Consumer's risk;

1. Introduction

Acceptance sampling plan constitutes one of the oldest techniques in Statistical Quality Control. It has an important role on common quality control techniques used in the manufacturing industry. It is desired to be a protective and efficient to make sure the quality control of such items. The sampling plan is determined to accept or reject a lot of items based on the life span time of the items is called reliability acceptance sampling plan. In a truncated life test using Single Sampling Plan, time is a main factor in check and fit the quality of the items. When the lifetime test suggests that the average life of items is lesser than the pre determined one, the lot of products is rejected, otherwise it is accepted. Accepting lots are ready for the production, while rejecting lots may be returned to the trader. For the main objective of minimizing the test time and cost, a truncated lifetime test may be run to determine the minimum sample size to make certain average lifetime of products when the lifetime test is stopped at a pre-determined time.

In the scheme of the truncated lifetime test is the number of defects 'd' and comparing the acceptance number 'c' . If the defects are lesser than acceptance number $d<c$, accept the lot and otherwise reject the lot. If defects are lesser than acceptance number c , is get before time t_0 put an end to the test and improve, the better quality of the product in the production management. In truncated life test use to find the minimum sample size to make certain an average life of items with specified confidence level P^*.

The Reliability Acceptance Sampling Plan for percentiles using various distributions are: Epstein (1954) designed acceptance sampling plan depends on life test presuming that the life time of a product follows the exponential distribution. Cameron. J.M (1952) has developed and designing tables for constructing and computing the Operating Characteristics of Single Sampling Plans.Gupta and Groll (1961) originated an acceptance sampling when the lifetime test truncated at a pre-fixed time and assumes to using the design of lifetime as gamma distribution.

Kantam and Rosaiah (1998) progress an acceptance sampling plan based on model for truncated pre determined lifetime random variable using the half logistic distribution. Kantam et al. (2001) evolved the sampling plan for lifetime follows log-logistic distribution with known shape parameter explaining an illustration with examples.Rosaiah et.al(2005) determines that the life time of the items follows the inverse Rayleigh distribution and origin the acceptance sampling for life tests. Al-Nassar, A.D. and Al-Omari, A.I. (2013) has developed an acceptance sampling plan depends up on truncated lifetime tests for exponentiated Frechet distribution. Rao et al. (2014) constructed the Exponentiated half log logistic distribution and its percentile estimator for designing acceptance sampling plans applying the similar method depend on its percentiles.

Kaviyarasu. V and Fawaz. P (2017) has designed an acceptance sampling plan of single sampling plan uses to truncated life tests based on percentiles using Weibull-Poisson distribution. Jayalakshmi.S, Neena Krishna P.K (2021) has developed a Special Type Double Sampling Plan for Life Tests Based on Percentiles Using Exponentiated Frechet distribution.

This paper mainly focusing the designing of an acceptance sampling plans truncated life test based on percentiles using Gompertz Frechet distribution. Oguntunde et. al (2019) has developed by Gompertz Frechet distribution properties and applications. The real time application of Gompertz Frechet distributions are reliability studies, hydrology, finance and so on.

2. Gompertz Frechet Distribution

The life time distribution of the product follows as Gompertz Frechet distribution with the scale parameter is α and shape parameters areβ,γ,θ. The Cumulative Distribution Function (CDF) and Probability Density Function (PDF) of the Gompertz Frechet distribution is given by

$$F(x,\alpha,\beta,\gamma,\theta) = 1 - exp[(\frac{\theta}{\gamma})(1-(1-exp[\frac{\alpha}{x}]^{\beta})^{-\gamma})] \tag{1}$$

and

$$f(x,\alpha,\beta,\gamma,\theta) = \theta\beta\alpha^{\beta}x^{-\beta-1}[exp[-\frac{\alpha}{x}]^{\beta}](exp[-\frac{\alpha}{x}]^{\beta})^{-\gamma-1} * exp[\frac{\theta}{\gamma}(1-(1-exp[\frac{\alpha}{x}]^{\beta})^{-\gamma})] \tag{2}$$

where α>0, β>0, γ>0, θ>0

2.1. Percentile Estimator

The q^{th} percentile function of the any distribution is given below,

$$Pr(T \leq t_q) = q \tag{3}$$

$$t_q = \alpha[-log[1-\frac{\gamma}{\theta}[log(1-q)]^{-\frac{1}{\gamma}}]^{-\frac{1}{\beta}} \tag{4}$$

$$\alpha = \frac{t_q}{\phi_q} \tag{5}$$

where

$$\phi_q = [-log[1-\frac{\gamma}{\theta}[log(1-q)]^{-\frac{1}{\gamma}}]^{-\frac{1}{\beta}} \tag{6}$$

$$\delta_q = \frac{t}{t_q} \tag{7}$$

Replacing the value of scale parameter α by 5 in 1 then we obtained the Cumulative Distribution Function of Gompertz Frechet distribution is

$$F(t,\alpha,\beta,\gamma,\theta) = 1 - exp[\frac{\theta}{\gamma}(1-(1-exp[\frac{-1}{\phi_q\delta_q}])^{\beta}]^{-\gamma})] \tag{8}$$

Taking a first derivative of partial differentiation with respect to δ, we get

$$\frac{\partial(t,\delta)}{\partial\delta} = \frac{1-exp^{(\frac{\theta}{\gamma})}}{\phi_q(\delta_q{}^2)}[\gamma(1-exp[\frac{-1}{\phi_q\delta_q}]^{\beta})^{-\gamma-1}\beta exp(1-exp[\frac{-1}{\phi_q\delta_q}]^{2\beta-1})] \tag{9}$$

3. Designing of single sampling plan through Gompertz Frechet Distribution

Single Sampling Plan is the key for all attribute acceptance sampling. The elementary form of single sampling plan is relates with dichotomous situations in which the inspection results can be classified into two classes of outcomes such as accept and reject of the lot.A sampling inspection scheme in which a decision to accept or reject an inspection lot is based on the inspection of a single sample. A single sampling plan consists of a single sample size with associated acceptance number(c). If taking random sample size n from the Lot size N then conducting the inspection with the number of defectives (d) found and compared to an Acceptance number (c). If the number of defectives found is less than or equal to acceptance number (c), the lot is accepted. Otherwise, the lot is rejected.For a single sampling plan, one sample of items is selected at random from a lot and the disposition of the lot is determined from the resulting information. The random sample size values of Single Sampling Plan follows Binomial Distribution denoted by $B(n, c, p)$. It has developed procedure of single sampling plan whose parameter p is assigned to follow Gompertz Frechet distribution with parameters $\delta_0 = \frac{t_q}{t_q^0}$ Where, t and t_q^0 are the specified time test duration and specified 100_q^{th} percentile of the Gompertz Frechet distribution respectively. According to Cameron (1952), the smallest size n can be given by satisfying,

$$\sum_{i=0}^{c} \binom{n}{i} (p)^i (1-p)^{(n-i)} \tag{10}$$

Where, (1-p^*) is the consumer risk and p^* is the probability of accepting the good lot.

4. Operating Procedure for Acceptance Single Sampling Plan through Gompertz Frechet distribution Percentiles for life testing

The operating procedure of the suggested plan is follows as:

- Taking a sample of size n within a test for time t_0
- Find the number of defectives d and comparing the acceptance number c .

i If d > c, reject the lot.
ii If d $\leq$ c, accept the lot.

- If d > c, is get before time t_0, put an end to the test and improve the better quality of the product in the production management.

4.1. Minimum sample size for 10^{th} percentile using Gompertz Frechet Distribution

For a predetermined P^*, our sampling plan is described by (n, c,t/t_q). Here we observe that acceptably exhaust sized lots and also that the binomial distribution can be applied. The study is to determine for given values of P^* (0 < P^*<1), t_q^0 and c, the smallest non-negative integer n required to assured that t_q<t_q^0 must satisfy

Step 1: Find the value of ϕ for fixing the values of parameters are θ, β,γ and q=0.10.

Step 2: Set the calculate value of ϕ =0.7785, c=0 to 10, and t/t_q = 0.9, 0.95, 1.0, 1.1, 1.25, 1.5, 1.6, 1.65 Find the minimum value of n satisfying

$$L(p) = \sum_{i=0}^{c} \binom{n}{i} (p)^i (1-p)^{(n-i)} \leq (1-p^*) \tag{11}$$

where p^* is the probability of accepting the good lot.

Table 1: *Gives the minimum sample size 'n' for the specified 10^{th} percentile value ${t_{0.10}}^0$ of Gompertz Frechet Distribution to exceed the actual 10^{th} percentile value $t_{0.10}$, with probability p^* and acceptance number c using binomial approximation*

		$t/t_{0.10}$								
P^*	c	0.9	0.95	1	1.1	1.2	1.25	1.5	1.6	1.65
0.75	0	8	6	4	2	1	1	1	1	1
	1	20	9	5	4	4	3	3	2	2
	2	26	24	18	8	7	6	5	4	3
	3	32	28	13	7	6	6	5	4	4
	4	40	37	28	13	8	7	7	6	6
	5	66	58	43	29	27	14	12	9	8
	6	71	63	58	46	33	27	18	13	10
	7	86	69	60	57	43	32	27	22	17
	8	92	89	78	65	54	42	31	28	19
	9	116	104	93	82	67	55	44	36	20
	10	125	105	95	86	74	66	59	43	32
0.90	0	10	7	5	4	3	2	1	1	1
	1	26	10	7	6	5	3	2	2	2
	2	33	25	19	9	8	7	6	5	3
	3	44	30	23	10	7	7	5	4	4
	4	56	41	29	14	9	9	8	8	7
	5	67	59	47	30	28	23	20	17	13
	6	72	65	59	46	36	32	28	26	21
	7	87	81	72	59	54	43	38	34	26
	8	94	89	79	66	57	51	48	42	36
	9	126	123	102	96	80	72	59	52	41
	10	128	120	116	92	78	67	56	42	39
0.95	0	11	8	7	5	4	3	1	1	1
	1	28	12	8	7	5	4	3	2	2
	2	38	25	20	12	9	7	6	4	3
	3	49	34	25	15	8	7	6	5	4
	4	57	45	31	15	10	10	9	8	7
	5	69	63	48	32	28	25	23	20	18
	6	76	66	60	49	47	35	30	27	24
	7	90	82	73	62	55	48	41	39	35
	8	105	94	89	72	68	59	52	47	42
	9	128	124	103	99	82	79	61	57	43
	10	139	125	117	98	83	79	62	59	53
0.99	0	20	15	8	6	4	3	1	1	1
	1	30	20	10	8	7	6	5	3	2
	2	40	25	20	13	9	8	7	6	5
	3	58	36	29	16	12	12	12	12 '	10
	4	75	54	42	35	20	20	20	19	14
	5	96	63	51	33	32	31	29	29	27
	6	102	92	81	60	57	48	46	39	38
	7	118	106	99	82	71	64	59	44	42
	8	167	158	104	99	87	73	61	59	45
	9	183	160	113	103	94	81	78	62	59
	10	199	181	179	154	121	108	96	79	61

4.2. Operating Characteristic Function

The operating characteristic function of the sampling plan gives the probability of accepting the lot L(p) with,

$$L(p) = \sum_{i=0}^{c} \binom{n}{i} (p)^i (1-p)^{(n-i)} \tag{12}$$

The producer's risk α is the probability of rejecting a lot when $t_q > t_q^0$. And for the given producer's risk α, p as a function of d_q should be simulated satisfying the condition given by Cameron (1952) as

$$\sum_{i=0}^{c} \binom{n}{i} (p)^i (1-p)^{(n-i)} > (1-\alpha) \tag{13}$$

Where, p=F (t,δ_0) and F (.) can be obtained as a function of d_q for the sampling plan developed, $d_{0.1}$ values are obtained at the producers risk α=0.05.

Table 2: *Operating characteristic values of the sampling plan (n, c, t/$t_{0.10}{}^0$) for given p* under Gompertz Frechet distribution*

			$(t_{0.10})/(t^0_{0.10})$							
P^*	n	$t/t_{0.10}$	1.95	2	2.5	2.75	3	3.25	3.5	4
0.75	18	1.0	0.0019	0.0059	0.7651	0.9160	0.9756	0.9944	0.9990	0.9999
	8	1.1	0.0124	0.0548	0.7748	0.9276	0.9836	0.9971	0.9995	0.9999
	7	1.2	0.0875	0.0911	0.8284	0.9428	0.9853	0.9972	0.9996	0.9999
	6	1.25	0.1412	0.1920	0.8381	0.9627	0.9993	0.9993	0.9999	1.0000
	5	1.5	0.3024	0.3382	0.9919	0.9994	0.9999	0.9999	1.0000	1.0000
	4	1.6	0.3073	0.3442	0.9964	0.9998	0.9999	1.0000	1.0000	1.0000
	3	1.65	0.4340	0.4143	0.9997	0.9999	1.0000	1.0000	1.0000	1.0000
0.90	19	1.0	0.0020	0.0066	0.7748	0.9160	0.9756	0.9971	0.9995	0.9999
	9	1.1	0.0157	0.0694	0.7902	0.9428	0.9853	0.9986	0.9990	0.9999
	8	1.2	0.1074	0.1942	0.8284	0.9506	0.9917	0.9944	0.9998	0.9999
	7	1.25	0.1725	0.2116	0.8747	0.9631	0.9919	0.9990	0.9999	1.0000
	6	1.5	0.2267	0.2812	0.9899	0.9992	0.9999	0.9999	1.0000	1.0000
	3	1.6	0.4022	0.4304	0.9957	0.9997	0.9999	1.0000	1.0000	1.0000
	3	1.65	0.4340	0.4327	0.9996	0.9999	1.0000	1.0000	1.0000	1.0000
0.95	20	1.0	0.0023	0.0074	0.7651	0.9160	0.9756	0.9944	0.9990	0.9999
	12	1.1	0.0268	0.0721	0.7748	0.9276	0.9836	0.9971	0.9995	0.9999
	9	1.2	0.1272	0.1977	0.7902	0.9428	0.9853	0.9972	0.9999	0.9999
	7	1.25	0.1725	0.2116	0.8284	0.9506	0.9919	0.9990	0.9999	1.0000
	6	1.5	0.2267	0.2815	0.9899	0.9992	0.9999	0.9999	1.0000	1.0000
	4	1.6	0.4024	0.4344	0.9950	0.9997	0.9999	1.0000	1.0000	1.0000
	3	1.65	0.4422	0.4443	0.9995	0.9999	1.0000	1.0000	1.0000	1.0000
0.99	20	1.0	0.0027	0.0074	0.7750	0.9650	0.9840	0.9945	0.9992	0.9999
	13	1.1	0.0310	0.0855	0.8546	0.9681	0.9850	0.9988	0.9997	0.9999
	9	1.2	0.1272	0.1978	0.8685	0.9986	0.9895	0.9989	0.9999	0.9999
	8	1.25	0.2007	0.2404	0.9879	0.9993	0.9899	0.9990	0.9999	1.0000
	7	1.5	0.2561	0.2811	0.9950	0.9995	0.9999	0.9996	1.0000	1.0000
	6	1.6	0.4875	0.4361	0.9996	0.9998	0.9999	1.0000	1.0000	1.0000
	5	1.65	0.5110	0.5985	0.9998	0.9999	1.0000	1.0000	1.0000	1.0000

5. Illustration with Real Life Applications

Assuming that the conduct an inspection of the lifetime of battery saver of Smart Watch. The study was based on inspection lifetime product which follows a Gompertz Frechet distribution. The Gompertz Frechet distribution has a three shape parameters it uses to fixing a value of length, breath and thickness of the battery saver of smart watch as θ=6, β=3, γ=0.06 respectively. Figure 1 represents the example for Battery Saver of Smart Watch.

Figure 1: *Battery Saver of Smart Watch*

An Experimenter wants to conduct the runtime of experiment is 3000hrs but the laboratory has the testers to true percentile life time $t_{0.10}$=1800 hrs, c=2, α = 0.05, β=0.05, then, ϕ=0.7785 is computed from the equation get under the percentile estimator and the minimum ratio,$t/t_{0.10}{}^0$=1.0 and minimum sample size is n=20 get the information from the Table 1. The probability of acceptance is characterized by (n, c, $t/t_{0.10}{}^0$) = (20, 2, 1.0) with p* = 0.95 under Gompertz Frechet distribution the values from Table 2 are given below.

$t_q/t_q{}^0$	1.95	2	2.5	2.75	3	3.25	3.5	4
L(p)	0.0023	0.074	0.7651	0.9160	0.9756	0.9944	0.9990	0.9999

Figure 2 represents the Two point Operating Characteristic curve for Single Sampling Plan using 10^{th} percentile for Gompertz Frechet Distribution. The Acceptable Reliability Level (ARL) and Limiting Reliability Level (LRL) are determined through producer's confidence level (1-α) and consumer's level β. An product is considered as $t_{0.10} \geq t_{0.10}{}^0$ and otherwise it is considered to be a bad of the product. The Reliability acceptance Sampling plan is considered as good one of the product if both risks are minimized. It reveals that if the true 10^{th} percentile is almost equal to the essential 10^{th} percentile $(t_{0.10}/t_{0.10}{}^0 = 1.0)$ the producer's risk nearly 0.9757 (1-0.023). The producer's risk is an almost nearly equal to Zero whenever the actual 10^{th} percentile is greater than or equal to 3 times the specified 10^{th} percentile.

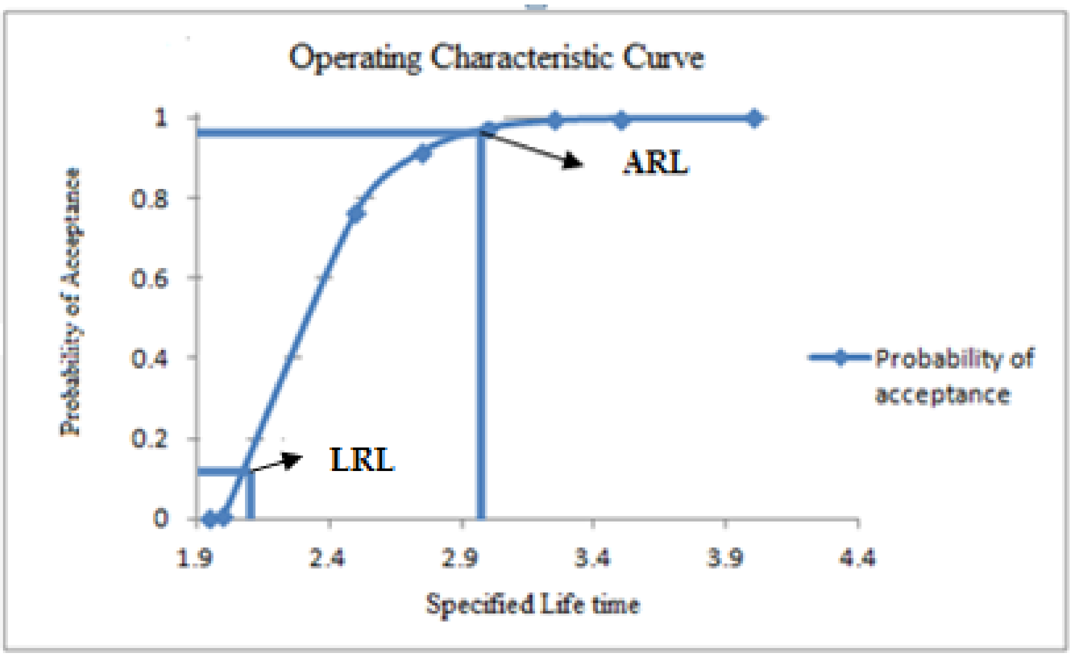

Figure 2: *Operating Characteristic curve for Single Sampling Plan using 10^{th} percentile for Gompertz Frechet Distribution*

5.0.1 Real Data Application

We consider the real data application was recorded from Bi and Gui (2017). The dataset describes strength of carbon fibers tested under tension at Gauge lengths of 20mm. The observations are as given below:

	1.312,	1.314,	1.479,	1.552,	1.700,	1.803,	1.861,	1.865,	1.944,	1.958,
1.966,	1.997,	2.006,	2.021,	2.027,	2.055,	2.063,	2.098,	2.140,	2.179,	2.224,
2.240,	2.253,	2.270,	2.272 ,	2.274,	2.301,	2.301,	2.359,	2.382,	2.382,	2.426,
2.434,	2.435,	2.478,	2.490,	2.511,	2.514,	2.535,	2.554,	2.566 ,	2.570,	2.586 ,
2.629,	2.633,	2.642,	2.648,	2.684,	2.697,	2.726,	2.770,	2.773,	2.800,	2.809,
2.818,	2.821,	2.848,	2.880,	2.954,	3.067,	3.084,	3.090,	3.096,	3.128,	3.233,
3.433,	3.585	3.585.								

First, we should check the given sample comes from Gompertz Frechet Distribution by the goodness of fit test and model selection criteria. So, we have to use the Q-Q Plot, Shapiro -wilk test, kolmogrov smirnov test and Histogram.Figure 3 graphically represents the Histogram satisfies the Normality of the given data. We get the result of KS test statistic is 0.039 and the Shapiro-Wilk test is 0.991. Figure 4 represents the graphically satisfies the Q-Q plot of the given data. Hence, the Gompertz Frechet Distribution could also provide reasonable goodness of fits for data set.

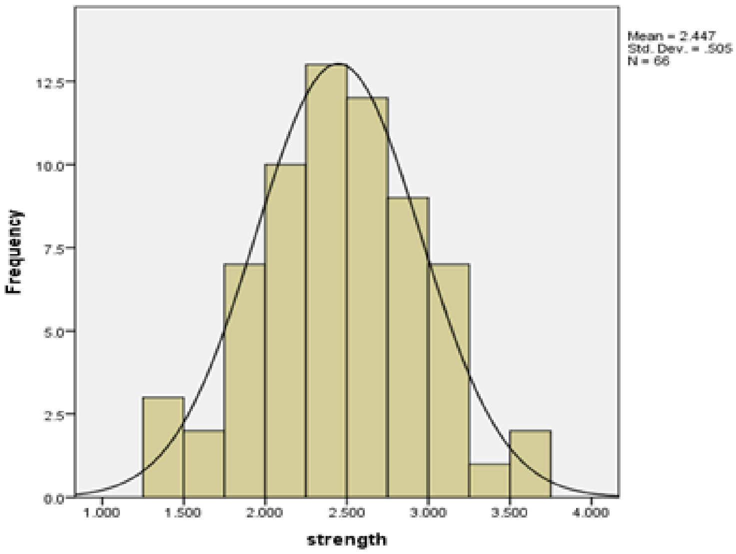

Figure 3: *Histogram*

Experimenter wants to make runtime of the experiment for 300 hrs. Further, the laboratory has the testers to actual percentile life time $t_{0.10}$=150 hrs, c=2, α = 0.05, β=0.05, then, ϕ=0.7785 is calculated from the equation get under percentile estimator and the minimum ratio, $t/t_{0.10}$=1.6 from Table 1 the minimum sample size from the obtained information is n=57. The probability of acceptance for the triplet values (n, c, $t/t_{0.10}$) = (57, 9, 1.6).

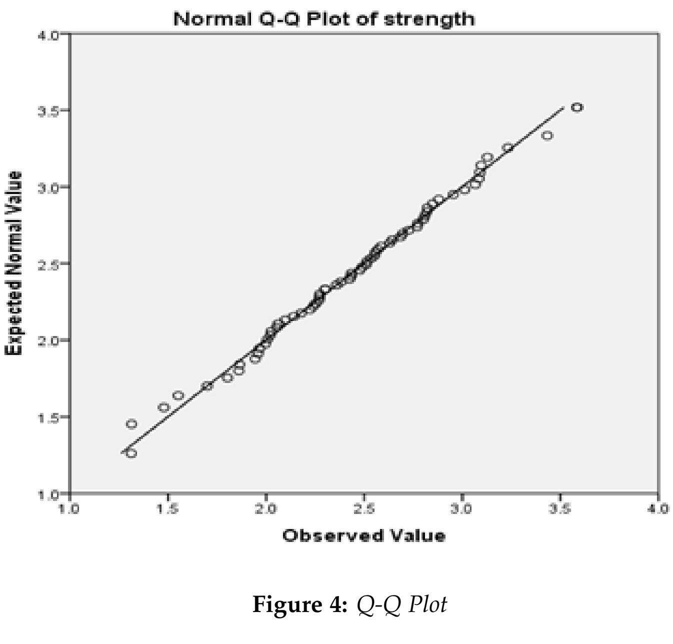

Figure 4: *Q-Q Plot*

Since there were no items with a failure time less than or equal to 300 hrs in the given sample of n = 57 observations, the experimenter would accept the lot, assuming the 10^{th} percentile lifetime$t_{0.10}$ of at least 150 hrs with a confidence level of p^* = 0.95.

6. Construction of the Table

The procedure uses to construction of Table 3 for the minimum ratio of true mean life for specified mean life for the acceptability of a lot with a producer‘s risk of 0.05.
Step 1: Find the value of ϕ for fixing the values of parameters are θ, β, γ and q=0.10.
Step 2: Set the evaluated ϕ, c=0 to 10, and t/t_q= 0.9, 0.95, 1.0, 1.1, 1.25, 1.5, 1.6, 1.65, 1.7.
Step 3: Find the smallest value of n satisfying where P^* is the probability of accepting the good lot.

Step 4: For the n value obtained find the ratio $d_{0.1}$ such that 13 where,p=F$\frac{(t_q)}{(t_q^0)} * \frac{1}{(d_q)}$ and $d_q = \frac{t_q^0}{t_q}$.

Table 3: *Minimum ratio of true mean life to specified mean life for the acceptability of a lot with producer‘s risk of 0.05 using Gompertz Frechet Distribution*

		$t/t_q{}^0$								
P^*	c	0.9	0.95	1	1.1	1.2	1.25	1.5	1.6	1.65
0.75	0	1.224	1.263	1.299	1.406	1.500	1.510	1.696	1.809	1.866
	1	0.783	0.846	0.896	0.900	0.901	1.086	1.175	1.282	2.083
	2	0.665	0.725	0.764	0.780	0.799	0.802	0.812	0.836	0.879
	3	0.364	0.457	0.552	0.593	0.682	0.718	0.725	0.756	0.779
	4	0.354	0.366	0.398	0.416	0.420	0.448	0.465	0.476	0.498
	5	0.254	0.266	0.277	0.298	0.314	0.352	0.365	0.398	0.406
	6	0.157	0.177	0.184	0.198	0.201	0.226	0.2365	0.308	0.311
	7	0.117	0.123	0.137	0.153	0.187	0.199	0.207	0.216	0.238
	8	0.139	0.139	0.149	0.153	0.169	0.198	0.206	0.209	0.211
	9	0.104	0.115	0.127	0.138	0.157	0.184	0.199	0.208	0.214
	10	0.043	0.061	0.075	0.107	0.115	0.120	0.130	0.139	0.142
0.90	0	1.297	1.342	1.386	1.504	1.612	1.633	1.860	1.984	2.046
	1	0.896	0.936	1.089	1.188	1.276	1.362	1.467	1.578	1.68
	2	0.734	0.756	0.768	0.772	0.796	0.803	0.813	0.822	0.846
	3	0.573	0.598	0.608	0.611	0.627	0.697	0.747	0.768	0783
	4	0.477	0.498	0.502	0.699	0.739	0.753	0.763	0.788	0.792
	5	0.365	0.379	0.399	0.409	0.416	0.427	0.438	0.448	0.468
	6	0.267	0.279	0.288	0.291	0.301	0.316	0.328	0.338	0.340
	7	0.217	0.226	0.238	0.247	0.257	0.268	0.277	0.289	0.299
	8	0.190	0.199	0.201	0.227	0.238	0.249	0.257	0.266	0.278
	9	0.117	0.124	0.145	0.153	0.167	0.178	0203	0.218	0.224
	10	0.098	0.106	0.118	0.126	0.138	0.146	0.158	0.188	0.199
0.95	0	1.334	1.394	1.443	1.568	1.684	1.713	1.964	2.095	2.161
	1	0.899	0.946	1.189	1.288	1.376	1.462	1.567	1.688	1.709
	2	0.739	0.766	0.779	0.880	0.896	0.903	0.913	0.922	0.946
	3	0.583	0.608	0.618	0.621	0.637	0.707	0.757	0.788	0793
	4	0.487	0.508	0.512	0.709	0.749	0.793	0.773	0.798	0.802
	5	0.375	0.389	0.409	0.419	0.416	0.437	0.448	0.458	0.468
	6	0.277	0.289	0.298	0.301	0.311	0.326	0.338	0.358	0.360
	7	0.227	0.236	0.248	0.257	0.267	0.278	0.287	0.299	0.309
	8	0.191	0.209	0.211	0.237	0.248	0.259	0.267	0.276	0.298
	9	0.127	0.134	0.155	0.163	0.177	0.188	0.213	0.228	0.234
	10	0.099	0.116	0.128	0.136	0.148	0.156	0.168	0.198	0.199
0.99	0	1.435	1.494	1.551	1.690	1.820	1.860	2.156	2.300	2.372
	1	0.909	0.946	1.189	1.288	1.376	1.462	1.567	1.688	1.709
	2	0.759	0.766	0.779	0.880	0.896	0.903	0.913	0.922	0.946
	3	0.593	0.608	0.618	0.621	0.637	0.707	0.757	0.788	0.793
	4	0.507	0.508	0.512	0.709	0.749	0.793	0.773	0.798	0.802
	5	0.395	0.389	0.409	0.419	0.416	0.437	0.448	0.458	0.468
	6	0.297	0.289	0.298	0.301	0.311	0.326	0.338	0.358	0.360
	7	0.237	0.236	0.248	0.257	0.267	0.278	0.287	0.299	0.309
	8	0.201	0.209	0.211	0.237	0.248	0.259	0.267	0.276	0.298
	9	0.137	0.144	0.165	0.173	0.187	0.188	0.223	0.238	0.244
	10	0.109	0.126	0.138	0.146	0.158	0.166	0.1788	0.208	0.219

7. CONCLUSION

In this article, reliability acceptance single sampling plan is developed based on the Gompertz Frechet distribution in directed to construct a decision of the lot. The single sampling plan gets the minimum sample size and Operating Characteristic values of the producer‘s risk. Tables and values are provided and applied to develop an acceptance sampling plans for real life application.In real life data application can be revealed that there were no items with a failure time less than or equal to 300 hrs in the given sample of n = 57 observations, the experimenter would accept the lot.

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