

Where $k = i$

$$p_a(p) = \frac{q^i(2 - q^i)}{f(1 - q^i)(1 - q^i) + q^i(2 - q^i)}$$

The average outgoing quality is

$$AOQ = \frac{p(1 - f)q^i(2 - q^k)}{f(1 - q^k)q^i + q^i(2 - q^k)}$$

Where $k = i$

The procedure is as follows

- Specify f = sampling frequency
- i = clearing interval
- Begin 100% inspection
- After i units in succession have been found without a defective, start sampling procedure.
- Randomly inspect a fraction of the units.
- When a defective is found, continue sampling for k successive sample units.

If no defective is found in the k samples, continue sampling on a normal basis. If a defective is found in the k samples, revert 100% inspection immediately.

4. Operating Procedure of CSP-3

- Dodge and Torrey (1951) derived performances measure u , v , f AOQ(P) and $P_a(p)$ for CSP-2 and CSP-3 plans. CSP-3 plan is a simple improvement of CSP-2 plans where the inspection of four during sampling is restored to when one of the four is found defective. It provides extra production against "spotty quality".
- Operating procedure of CSP-3 is same as CSP-2 except, in addition, being step (3) as follows:
- When a defective is found, inspect the next four units. If a defect is found in the four units, revert to 100% inspection of succeeding units as in step (1). If no defect is found in the four units continue sampling, but keep count of the number of units inspected after finding the defect.

Dodge and Torrey (1951) proposed the following performance measures and derived them by following approach.

The Average fraction of total production accepted on a sampling basis is

$$p_a(p) = \frac{q^i [1 + q^4(1 - q^k)]}{f(1 - q^{k+4})(1 - q^i) + q(1 + q^4(1 - q^k)) + 4fpq^i}$$

Where $k = i$

The average outgoing quality is

$$AOQ = \frac{p(1 - f)q^i [1 + q^4(1 - q^k)]}{f(1 - q^{k+4})(1 - q^i) + q[1 + q(1 - q^k)] + 4fpq^i}$$

Where $k = i$

The procedure is as follows

- Specify f = sampling frequency
- i = clearing interval
- Begin 100% inspection
- After i units in succession have been found without a defective, start sampling procedure.

- Randomly inspect a fraction of the units.
- When a defective is found, continue sampling for k successive sample units.

If no defective is found in the k samples, continue sampling on a normal basis. If a defective is found in the k samples, revert 100% inspection immediately.

5. Operating Procedure of CSP-4

The practical application of CSP-4 is a production process which alternates between producing all defective items during partial inspection and producing all non-defective items during 100% inspection, will not represent the least favourable case. In fact, for CSP-4 Derman plan required during sampling inspection i consecutive units to be conforming in order that the reduced clearance number.

x can be used during 100% inspection and hence the same clearance number i is used in both 100% inspection and sampling inspection. The modification proposed here is that during sampling inspection k consecutive units need to be found conforming in order to quality for reduced 100% inspection with clearance number x and the CSP-5 plan incorporating this modification is referred to in this plan.

The CSP-5 plan with its parameters are i , f , x , and k . Where $k = i$ this sampling plan becomes Aashim plan. But CSP-4 plan with its parameters are i , f , x , and k . Where $k = (i - k + 1)/k$ sampling plan becomes Derman, Johns and Lieberman (1959) the average fraction of total production, $P_a(p)$, accepted or passed on a sampling basis is given by

$$p_a(p) = \frac{q^i}{q^i + f[1 - q^i + q^{(i-k+1)/k}(q^i - q^x)]}$$

Where $k = (i - k + 1)/k$ The average outgoing quality is given by

$$AOQ(p) = \frac{p(1 - f)q^i}{q^i + f[1 - q^i + q^{(i-k+1)/k}(q^i - q^x)]}$$

Where $k = (i - k + 1)/k$ The procedure is as follows

- Specify f = sampling frequency
- i = clearing interval
- x = clearing interval ($< i$)
- Begin 100% inspection
- After i units in succession have been found without a defective, start sampling procedure
- Randomly inspect a fraction of the units.
- When a defective is found, continue sampling for k successive sample units.

If no defective is found in the k samples, continue sampling on a normal basis. If a defective is found in the k samples, revert 100% inspection immediately.

$$AOQL = \frac{(c_4 + 2) - 2\sqrt{c_4 + 1}}{c_4^2},$$

$$c_4 \neq 0; \frac{1}{4}, c_4 = 0 \text{ where } c_4 = (i - k + 1)/k$$

6. Operating Procedure of CSP-5

- At the outset, inspect 100% of the units consecutively as produced and continue such inspection until 'i' units in succession are found clear of defects.
 - When i units in succession are found clear of defects, discontinue 100% inspection and inspect only a fraction f of the units selecting individual sample units one at a time from the flow of product in such a manner as to assure an unbiased sample.
 - Continue sampling inspection at rate of until a nonconforming unit is found.
 - If a nonconforming unit is encountered during sampling inspection
- i) After at least i consecutive sample conforming units proceed to 100 inspection with clearance number x, which is less than i.
 - ii) Before reaching i consecutive sample conforming units, proceeding to 100% inspection with clearance number i, replace all non-conforming units with conforming units.

Lieberman and Solomon (1955) considered an extension of CSP-1 plan which

- a) Allows for smoother transition between sampling inspection and 100% inspection.
- b) Requires 100% inspection only when the quality submitted is quite inferior and
- c) Allows for a minimum amount of inspection when quality is definitely good.

A generalized CSP-5 plan is described and is referred to here as general CSP-5 plan. It is a Markov-Chain formulation performance measures and procedure for the construction. A special case of the general CSP-5 plan introduced. In situation where there is no advantage to reducing the sampling frequency upon demonstration of good product quality, reduced inspection can be achieved by using a smaller clearance interval. This is the main feature of CSP-5 plan proposed by Aasheim (1972). It is a single level continuous sampling procedure with parameters i, f and x, the reduced clearance number. Aasheim plan required during sampling inspection i consecutive units to be conforming in order that the reduced clearance number.

x can be used during 100% inspection and hence the same clearance number i is used in both 100% inspection and sampling inspection. The modification proposed here is that during sampling inspection k consecutive units need to be found conforming in order to quality for reduced 100% inspection with clearance number x and the CSP-5 plan incorporating this modification is referred to in this plan.

CSP-5 plan with its parameters are i, f, x, and k. Where k = i this sampling plan becomes Aasheim plan. The average fraction of total production, $P_a(p)$, accepted or passed on a sampling basis is given by

$$p_a(p) = \frac{q^i}{q^i + f[1 - q^i + q^k(q^i - q^x)]}$$

Where k=i

The average outgoing quality is given by

$$AOQ(p) = \frac{p(1-f)q^i}{q^i + f[1 - q^i + q^k(q^i - q^x)]}$$

Where k=i

The procedure is as follows

- Specify f= sampling frequency
- i= clearing interval
- x = clearing interval (<i)
- Begin 100% inspection
- After i units in succession have been found without a defective, start sampling procedure
- Randomly inspect a fraction of the units.
- When a defective is found, continue sampling for k successive sample units.

If no defective is found in the k samples, continue sampling on a normal basis. If a defective is found in the k samples, revert 100% inspection immediately.

7. Comparison of CSP-1 Plan With Other CSP Plans

1. In order to compare the performance of CSP-1 and CSP-2 plans, which are optimal for (CSP-1) $p = 0.06$ and (CSP-2) 0.09 each one ensuring the same AOQL of 0.05 .
2. The exact optimum CSP-2 $F > F^*$, the observed difference with optimum CSP-1 is too small to be of practical importance.
3. Find that in one case amount of inspection for other CSP plans are smaller than that of CSP-1 for higher values of p.
4. Dodge and Torrey expected that for same value of AOQL, inspection under CSP-2 will be less than that under CSP-1 if p is less than some values.
5. Note that for optimum CSP-1 and 2 plans the values of i are more or less same and other plans have some differences.
6. The amount of inspection for optimum CSP-2 is not smaller than the corresponding optimum CSP-1 plan the AOQ curve is better for optimum CSP-2 plan and comparing other sampling plans CSP=5 have better AOQ and OC curve.
7. Another important criterion will be to compare the pt (%) for all types of plans to know the protection offered against a sudden deterioration in quality.

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9. Conclusion

Acceptance sampling is the technique which deals with the procedure in which decisions to accept or reject the lots or process are based on the examination of samples. The work presented in this paper mainly relates to the continuous sampling plans namely CSP-1, CSP-2, CSP-3, CSP-4, and CSP-5 contain some differences due to the implementation, operating procedures and the theoretical foundation among them. Note that for optimum CSP-1 and 2 plans the values of i are more or less same and other plans have some

differences. The amount of inspection for optimum CSP-2 is not smaller than the corresponding optimum CSP-1 plan the AOQ curve is better for optimum CSP-2 plan and comparing other sampling plans CSP=5 have better AOQ and OC curve. Another important criterion will be to compare the p_t (%) for all types of plans to know the protection offered against a sudden deterioration in quality. Find that in one case amount of inspection for other CSP plans are smaller than that of CSP-1 for higher values of p .

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