

The Acceptable Quality Level (AQL)

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Exam

The standard quality maintained by a producer which may be acceptable to the consumers is known as acceptable quality level (AQL) and is denoted by p_1 . The AQL is given as a percentage or a proportion of defectives.

Lot Tolerance Proportion or Percent Defective (LTPD)

A consumer specifies a proportion defective ^{say p_2} and wishes that the lots having p_2 or more proportion defectives should not be accepted. This p_2 is known as lot tolerance proportion or percent defective (LTPD). The word percent defective is used when it is expressed in percentage.

Producer's and Consumer's Risks

A good producer producing the lots of acceptable quality faces a risk of rejection of lots i.e. there is some non-zero probability of rejecting a lot having acceptable quality p_1 . The probability of rejection of lots of acceptable quality is known as producer's risk. Clearly, if p_1 is the AQL then it is preferred to have sampling plans with OC curve passing through $(p_1, 1-\alpha)$ point, where α is the notation for producer's risk.

Similarly, there is some non-zero probability of accepting a lot having more than the tolerable proportion defective (p_2). Therefore, the consumer may have to bear the risk of accepting such lots.

3 Characteristics of OC curve:

- (1) The OC curve of an acceptance sampling plan shows the ability of the plan to distinguish between good lots and bad lots.
- (2) Fixed sample size tend towards constant quality protection.
It is the absolute size of the sample rather than its relative size that determines the quality protection given by the acceptance sampling plan.
- (3) The larger the sample size and acceptance number, steeper the OC curves, showing better discriminating power.

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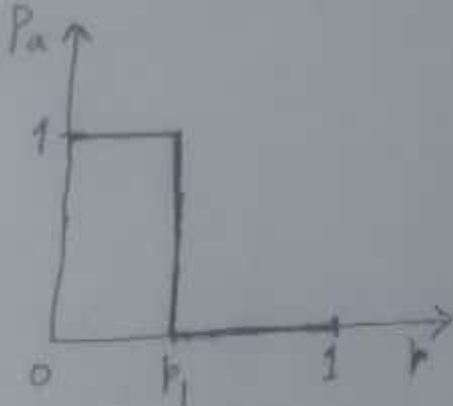
The Operating Characteristic (OC) Curve.

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The OC function is the mathematical expression giving the probability of acceptance of a lot as a function of fraction defective p in the lot. All lots having proportion defective less than or equal to acceptable quality (denoted by p_1) should be accepted and those having greater proportion defective should be rejected. If P_a denotes the probability of acceptance of a lot and p its proportion defective, then ideally

$$P_a = \begin{cases} 1 & \text{if } p \leq p_1 \\ 0 & \text{if } p > p_1 \end{cases}$$

A curve plotted between p and P_a is said to be OC curve. The ideal OC curve should be as shown below



For given sampling plan we can find the probability of acceptance P_a , for various values of p .

CBCS Course

S.S. in Statistics

Class : MA/MSc. Fourth Semester

Paper III : Statistical Quality Control and Reliability Theory

Unit : 2 , Lecture # 2

Title : Producers and Consumers Risks, OC, AQL & LTPD.

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