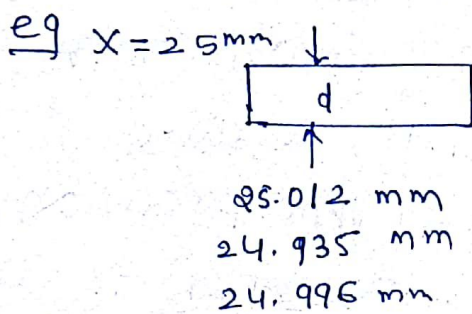
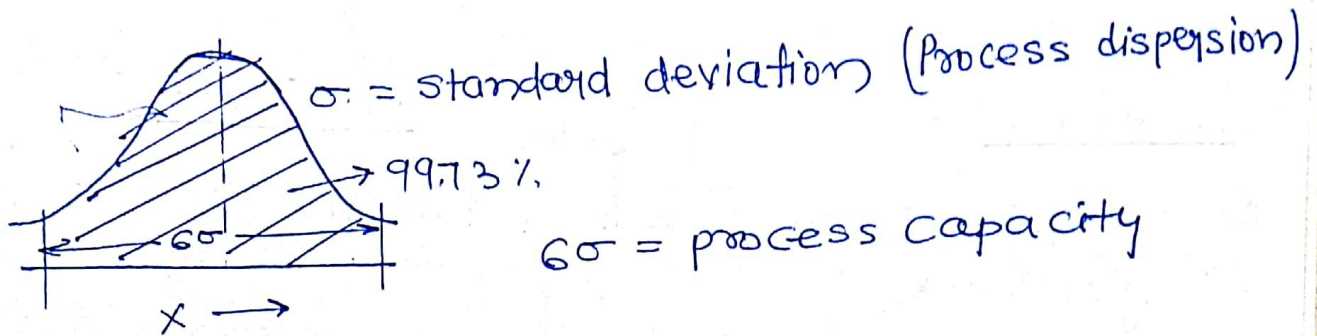


* METROLOGY *

2

Book I C Gupta.



$$25 \pm \boxed{0.05}$$

desired tolerance

Machine environment follow a normal distribution and the products coming out of the machine is like random data collection. Because of this reason dimension of two product will not match, that's why it is said in the production that whatever dimension ~~we~~ we have produce it is not possible to duplicate it. This fact both consumer and supplier know we can't make anything exact so an acceptable variation in dimension as specified by consumer is called tolerance.

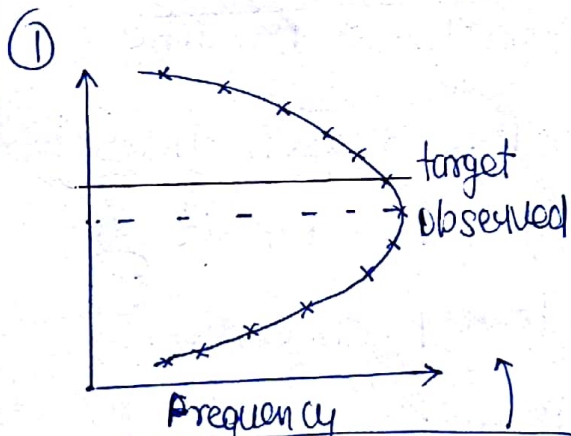
Any internal feature of assembly is called Hole and any external feature of assembly is called a shaft. In most of the case we will make the Hole first because standard sizes of drills and reamers available. ~~for any Ho~~

Accuracy! -

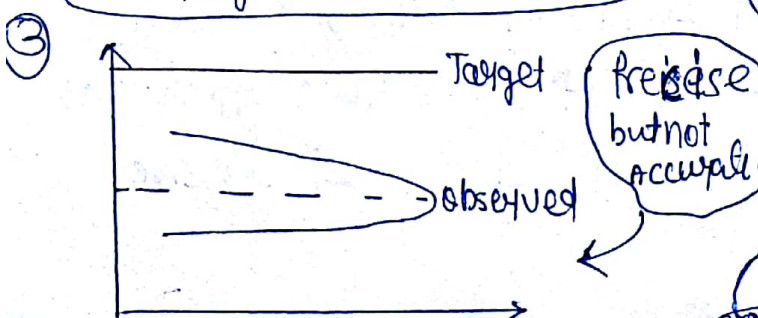
① Accuracy is closeness to the target value

② Accuracy refer to the median.

③ Accuracy refer to individual product



Accuracy but not precise



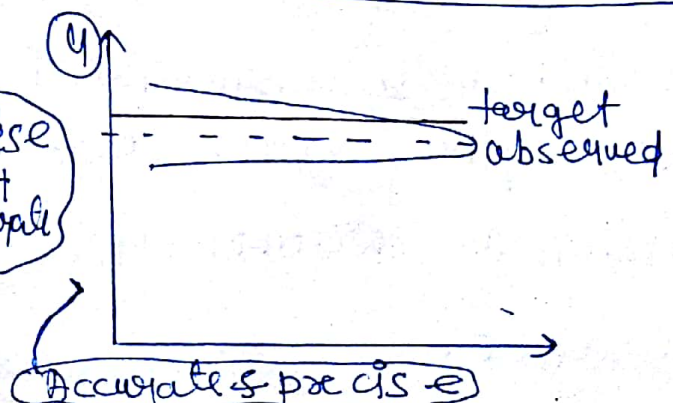
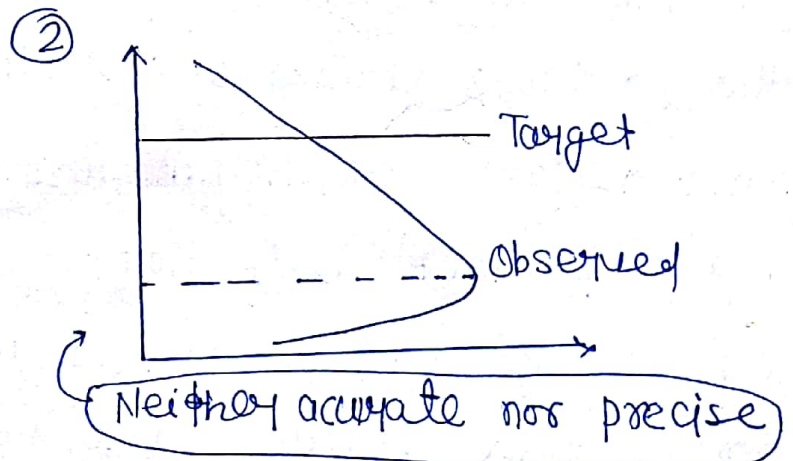
precise but not accurate

Precision

① Precision is Reatability

② Precision refer to S.D. of normal distribution. larger the value of σ lassey will be precision.

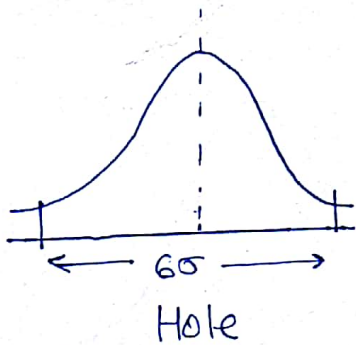
③ Precision refers to a Group



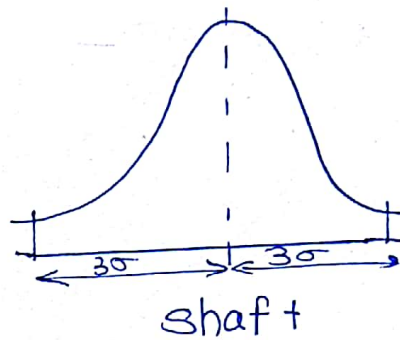
Active & Passive inspection:

- * Active inspection is also called online inspection i.e. inspecting the material when it is being produce and if something goes wrong corrective action can be taken.
- * Passive inspection is offline inspection i.e. inspecting the material after its production now checking it good or bad.

Full Interchangability :-



* desired tolerance $\checkmark$

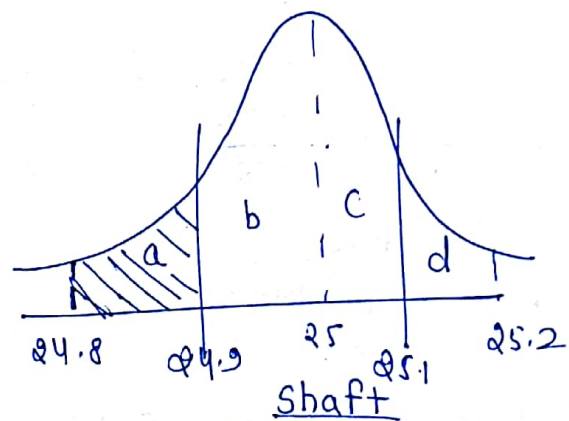
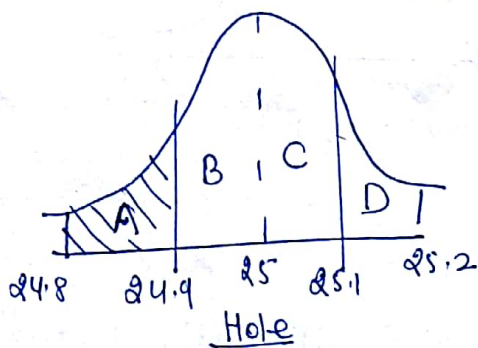


when the process capability^{of} machine producing Holes and shaft are equal to the desired tolerance in such a situation inspection is not required. Randomly a hole is selected from hole lot and shaft is selected from shaft lot assembly can be made this is called Full Interchangability. It is having following advantages.

- ① Holes and shaft can be made at different places where man and material are cheap.
- ② standardisation is possible.
- ③ Maintenance become cheap and easy.

Achieving the full interchangeability condition are difficult because processes capability are much larger as compare to desired tolerance.

Selective Assembly! —



eg $\Rightarrow$ Process capability = $4(\text{desired tolerance})$

$\Rightarrow$ $(0.4) = 4(\underline{0.1})$

Suppose process capability of both holes & shaft are equal to 4 times the desired tolerance then the process capability range will be divided into four equal parts.

To implement this situation as the product are coming out of the machine each and every product is inspected, and according to dimension it is placed in the respective sub group. After few thousand component, variation in dimensions within the subgroup will be equal to the desired tolerance. So when a hole is selected from subgroup 'A' and the shaft is selected from subgroup 'a', assembly can be made. This process of achieving full interchangeability although machine are not capable is called selective assembly.

Basic Size:- Basic size is the targeted value of the machine for which Holes and shaft ~~will~~ produced.
 has been.

Nominal size:- Nominal size nearest round number as per the standard. If $\bar{x} = 24.5 \text{ mm} \rightarrow \text{N.S.} = 25$

Desired Tolerance:- width of tolerance zone
Grade of tolerance

Fundamental deviation:- How far the tolerance zone from Basic size
(FD)