To maintain Insert dimensions by using Both Side Pressing method in powder compacting process

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ABSTRACT

Inserts are used for metal cutting operation. While removing material from Metal to maintain close dimension that is important part in machining operation. To maintain close dimension while operation is depends upon close dimension of insert. While cutting operation inserts all sides are used. For that all sides are close in dimension to avoid variation in component while operation like Turning, Milling & Metal cutting etc. Inserts are manufactured by powder pressing. After sintering process dimension of inserts is changed. To maintain dimension of insert we take number of trails to set insert data in blank. The method used for that is Top pressing but in Top pressing pressure are more in top side so there is variation top & bottom side insert dimension which cause low value of Centre of Process (CP) & Process capability Index (CPK) if this value is less than 1.1 & 1.33 then all inserts are rejected. Those values are calculated while setting insert data for manufacturing insert. The objective of Project - The problems coming by earlier method is reduce by using both side pressing method (Continuous pressing method). This method gives equal dimension in both side of inserts & maintain perfect dimension after sintering process also. This helps to improve quality, productivity, Customer satisfaction & problems of machine cylinder valve & data calculation for taking different trails which save time & human efforts. By doing experiment of both method & doing comparison of both method & good result submit to company to use better one method.

Keywords — cpcpkstatistical process control Insert Press Method

I. INTRODUCTION

In insert manufacturing powder is compressed by using press machine. There are many methods for pressing powder. But in Top pressing method pressure is applied on by top side in this cycle top move in die and bottom punch is steady and green powder blanks is produced. While applying pressure only form top side fine pressing is done on top side so there is less porosity on top side and more in bottom side. Effect of that after sintering process green compact is more shrink on bottom side and less in top side. This will cause effect on parameters of insert i.e. IC (inscribed circle), M dimensions, Cutting edge distance & Thickness. Some time Taper on insert this will lead to low values of CP (centre of process) & CPk (process capability index). Due to this whatever production is carried out is rejected. Such low cp&cpk affect major impact when such type insert when used at time machining operation will gives deviation in machining when operator change the side of insert so all side of insert must have close value. So to overcome problem due to Top pressing Method both side pressing (Continuous pressing) method is used in this method pressed is applied on a powder by both side so fine.
pressing on both side top and bottom side is done very
good and after sintering process shrinkage is equally on
both side will leads to give equal dimensions on all side of
insert. The Result is calculated by using statistical process.
This will gives information regarding acceptance or
rejection of production lot which is manufactured.

II. THEORY

Methods used for manufacturing insert is Top Pressing
Method in that method top pressure is given by using the
value 0.3 the meaning of that top will pressed the powder
by 0.3 mm from top side.

![Compaction Process](image1)

In Top pressing method value 0.3 mm means top will travel
distance 0.3 mm from top side

![Top Pressing Cycle](image2)

In continuous pressing method ie both side pressing
method the value is given 60% i. e. meaning of that 60%
pressing from top side and 40% from bottom side.

![Continuous cycle (both side pressing)](image3)

While conducting experiment and calculating result
statistical analysis method is used to check taken reading
component is accepted or rejected.

Statistical Method

<table>
<thead>
<tr>
<th>INDEX</th>
<th>ESTIMATED EQUATION</th>
<th>USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cp</td>
<td>(USL - LSL) / 6s</td>
<td>Process Capability for two - sided specification limit, irrespective of process center.</td>
</tr>
<tr>
<td>Cpu</td>
<td>(USL - X-Bar) / 3s</td>
<td>Process Capability relative to upper specification limit.</td>
</tr>
<tr>
<td>Cpl</td>
<td>(X-Bar - LSL) / 3s</td>
<td>Process Capability relative to lower specification limit.</td>
</tr>
<tr>
<td>Cpk</td>
<td>Min. of (Cpu, Cpl) or Distance between mean of the process and the closest spec. limit / 0.5 of the process variability.</td>
<td>Process Capability for two - sided specification limit accounting for process centering.</td>
</tr>
</tbody>
</table>

Notes:

1. If X-Bar is at target, then Cpk = Cpl.
2. Cpk will always be equal to or less than Cp.

These are standard result from statistical process control
(SPC) analysis. By using this theorem result are calculated.
And confirmation of result whether to accept or reject is depend upon following result of statistical process.[5]

III. RESULT AND CONCLUSION

For Top pressing Method (OB)

The better result obtained from Continuous Pressing Method.
This will improve quality of production.
All side dimensions of inserts are Equal.

REFERENCES


Ali RzaMotorcu, AbdulkadirGu”llu” Statistical process control in machining, a case study for machine tool capability and process capability.