

AN OVERVIEW OF COLD FORGING OPERATION WITH THEIR DEFECTS

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Abstract:-

The objective of this paper is to Identify and understand different cold forging processes and investigate the different cold forging defects. Initially different kind of material that can be used for cold forging are discussed. A brief description of parts formed by cold forging is described with their specification.

Keyword:- Cold forging,Materials,Parts formed in cold forging,Defects

1)Introduction:-

- Forging, it is a manufacturing process in which workpiece is shaped by applying compressive forces on workpiece.Types of forging are Cold and Hot.
- It is distributed according to temperature at which operation is performed.
- Hammers or presses are used most commonly to deform the part into high strength part.
- The cold forging process is performed at room temperature.The workpiece is compressed between two dies until it get specified shape.To deliver a final ready to fit component different techniques are used like wire drawing, pressing and heading.

1.1)Different Types of Materials That can be Used for Cold Forging are:-

- Low carbon steel: SAE 1008,1010,1015,1018,1020
- Medium carbon steel:SAE 1541,1030,1040
- Alloy steel :-SAE 4135,4140,Boron steel,SAE 8620, 16mncr5, 15B41 ,15B25

2)List of parts manufactured by cold forging

Some of Machine Parts that can be made from Cold forging are:-

Bolts- It is a workpiece, form of threaded fastener with an different types of external threads as per requirement.

Shear Connector- Shear connectors are designed to tie the concrete and the steel beams effectively and to resist shear loading.

Pin-Pin is mechanical part that fixes or secures the position of two or more parts of a machine with respect to each other.

Screw- It is a type of fastners,similar to bolt and externally threaded.The commom use of screw are to hold objects together and to position it.

Wire Parts-This parts made from raw material in the form of wire.Such as,Tie rods, Hooks, Handles, Tie bars, Links ,Brake rods etc.

Studs-Stud is a mechanical part which is threaded on both side and it has no head.

Rivets

It is a mechanical part use to join two or more machine parts permanently. It consist of cylindrical shaft with head on one end.

2.1)Features Of Cold Forging :

- Corrosion resistant
- Resistant to wear and tear
- Reliable
- High quality
- Durability
- Fine finish
- Precise dimension
- Competitive price
- Long-lasting
- Efficient performance
- Dimensional accuracy
- Low maintenance

2.2)Ideal For:

- Electrical
- Automobile
- Luggage
- Furniture Industry
- Machine Manufacturing
- Construction Industry

2.3)Applications

Various Automobiles

Used as Non threaded fasteners

Agricultural Equipments

White Goods

Electrical Engineering products

Furniture

Castors, etc.

3)METHODOLOGY

Some secondary operations used to form cold forged parts are described below:-

- Pre coating
- MF threading
- Drilling
- Grinding
- Chamfer
- Straightening
- Head shaving and head facing
- Face chamfer
- Filling
- Case carbodiassing
- Oiling
- Polishing

3.1)Surface Treatment

- Zinc plating
- Cobolt Zinc plating
- Trivalent Zinc plating
- Tin Plating
- Copper plating
- Nickels plating
- Powder coating on head
- Phosphate coating

4)Problems & Solutions:-

4.1)How to avoid taper threading on cold forged parts in automatic threading machine?

Solution:-

By the method of wire drawing before forging operation. Draw Wire as per wire draw indent slip.By adding wire size to wire draw indent sleep and then pass through wire drawing machine. It Eliminate the Rework Cost.

Using this method we solved problems like,

- Taper Thread during Threading.
- Part head damage at forging stage
- Wire bend at forging stage

Result:-Rejection turn down to zero.Taper threading avoided.

4.2)Head shift during the forging process on the flat punch for round headed center bolts.

It happens due to,

- Flat punch used in forging.
- Inadequate design of punch.

Solution:- It can be avoided by providing the punch having round slot for avoiding head shifting problem.

Results Obtained:-

- 1) Rejection reduced to zero.
- 2) Head does not move out.
- 3) Dimensionally correct head.
- 4) Material wasted in machining avoided and so does the machining process.

4.3) After Forging operation, Trimming operation required for the part.

- Trimming operation carried out separately.
- Forging of part earlier carried out in 4 stages

Reason:- No use of Trimming punch and die .No use of progressive tooling.

- **Solution:-** To Provide the trimming punch and die for the part.
Take the trimming punch in forging operation at last stage.

Result:- Extra cost of trimming operation saved.

4.4) At the end of coil ,wastage of Raw Material occurs due to no support.

- **Objective:-** To Save the R/M of wastage wire piece at the end of the coil.
Root cause:-
No provision for push the end piece after the coil pressure roller in the machine assembly.

Solution:-To use next coil start piece to push the end piece of the last coil. Use the same wire size of next coil. Insert new wire in same line as that of previous remaining wire.

Result:-

1. Save the raw material cost per coil.
2. Increase the Production Qty. after every coil.
3. Wastage comes down to zero.

5)Conclusion:-

This paper gives a review of optimization of problems faced in cold forging operation in industry.Cold forging optimization has been done by many authors using different methods excellently.Still it is require getting less rejection and higher accuracy in result,which can be achieved by using above given information.

6)References:-

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