



## METHODS AND TOOLS OF RESEARCHING THE TECHNOLOGIES OF BEARING RINGS FROM COMPOSITE MATERIALS

**Akbarjon Baymirzaev**

*PhD, Department of Materials Science and Technology of New Materials, Andijan Machine-Building  
institute, Andijan, Uzbekistan  
akbarshoxashox@gmail.com*

### Annotation

*"ANDIJON ENERGO TAMIRLASH" LLC was selected as a research enterprise based on the casting of material for bearing rings. The main indicators of the research conducted on the technological basis are based on the casting detail obtained there.*

*Activities that can be performed at a research facility include processes ranging from melting ingots to machining them.*

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### Introduction

Above, we talked a little about the technology of obtaining the material of the bearing ring, and in this chapter we will get acquainted with some technologies. Before deciding on the casting technology that is expected to be implemented in the research object, it is advisable to study the existing and used technologies, but taking into account the low level of opportunity for use in our regions.

Bearings operate under conditions of very high contact stresses, reaching 6000 MPa in some cases. Therefore, bearing steels should have a dense homogeneous structure (macrostructure), minimal amounts of non-metallic inclusions, and minimum carbide should not be uniform.

Non-metallic inclusions in bearing steel not only reduce the durability of bearings, but they are also reflected in some other indicators of bearing quality. For example, with significant contamination of iron with non-metallic inclusions, it is almost impossible to obtain a high cleanliness class of the surface of the bearing parts. Contamination of steel with non-metallic additives in tool bearings leads to loss of ease of rotation, increase of "starting torque".

### Material and Methods

One of the important indicators of the quality of steel, which determines the performance of bearings, is the macro, in particular, the axial and general porosity of the metal. The idea that it is not particularly harmful is a mistake. This is based on the fact that the axial zone of the metal does not protrude into the working surface of the bearing parts.

In the production of tubes from bearing steel, the inner metal zone is not completely removed, but is located on the inner surface of the tube and, as a result, appears on the working surfaces of the outer rings of the bearings. In the production of bearing balls, the inner metal zone extends to the working surface in the area of their columns, which shortens the service life of the bearings.



In the next sections of this chapter, we will learn about bearing ring material extraction technologies and their differences

## Results

This method is used to obtain bearing rings in large sizes. It is not possible to get such large sizes in GKM. Such bearing rings, obtained in the technology of individual production, do not lead to economic efficiency

The bearing rings obtained by the free hammering method are made at the production facilities (pneumatic, steam compressors) with the help of workbenches, and using the universal tool equipment, they have only a cylindrical shape. It is necessary to heat and punch the center of the prepared cylindrical part in one more process. It was necessary to go through more complex technological processes to make the resulting ball into a correct cylindrical shape again. Force punching metal has also had problems.

## Discussion

It was possible to produce the bearing rings in the size of 70mm-1500-2000 by free hammering method. In it, 500-800 bearing rings were sent to enterprises of the heavy machinery industry and punched in the middle on steam and pneumatic machines under very high pressure.

The free hammering method has been considered the main technological process only for individual and small series production. In this case, during heating and free hammering, soot is formed on the surface of the detail, and mechanical processing is necessary. Later, cutting the raw material to size is performed on another machine and is a labor-intensive process.

Removal of bearing rings is carried out automatically by GKM and krivoship connecting rod mechanisms and hammers. In this case, the upper part of the raw material is cleaned from soot by drab (with the help of steel balls in the drum), then it is heated again at 1250oC, then it is re-stamped by volume stamping method (GKM) and continuous production of bearing rings is carried out.

## Conclusion

The method of producing bearing rings by punching the continuously cast ShX-15 steel, which has a scientifically based economic efficiency, is shown.

1. The implementation of this technology requires the following tasks. Obtaining bearing rings by metalworking from the raw material of bearing st ShX-15, which is continuously cast, heated in this process.
2. In the process of metal cooling, the solid solution is pierced along the non-dense axis without cooling.
3. It is proposed to introduce this technology into production, i.e., to introduce into production the production of bearing rings by the method of free hammering of continuously cast metal without supercooling.

Under laboratory conditions, hammering, stretching, and pressure treatment of metals with a force of 1.6kn in a hydraulic press were carried out in the workshop of steel and alloys.

Production of continuous cast steel for industrial and production use by hammering is carried out at the Volgograd bearing plant, with a hammer size of 500-400mm. The implementation of such technology was applied to parts with small bearing ring sizes.

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