

Purpose

Solution to problems of design, manufacture, repair and operation of cane mill crowns.

Background

Due to wear on the faces of the teeth the life of the crown is relatively short, therefore, some technicians understand that it is necessary to give them practical solution to these problems using welding.

The crowns of the cane mills represent a sui generis transmission by working with the distance between variable centers. They are made of cast steel and transmit the movement of the upper mallet to the two lower mallets. In addition to ensuring the variation of the distance between centers during operation, the gear system (3 crowns) must ensure the adjustment of the mill during the season, this makes the tooth profile have a special design.

Some argue that the mechanical efficiency of a pair of crowns does not exceed 85%, and that the power transmission efficiency of the upper than lower crown is 61%.

The surface hardness on the contact or rolling face of the tooth is considered low and averages 220 HB and the quality of the crown depends a lot on the manufacturer, however, defects such as discontinuity in tooth contact, conicity and interference between the faces of the teeth are common. These defects generate excessive loads that can cause breakages of teeth and other mechanical elements of the mill that also generate wasted time when they fail.

Mill crowns are usually "welded" but design failures are not corrected. One detail that is sometimes not considered is that new crowns are put to work with used ones - many times - the latter filled with welding.

It also often happens that the 3 filled crowns are put to work, but with different welds, which makes the hardness between the working faces of the teeth not homogeneous, and therefore the softer fails.

Finally - but importantly - is that crowns of "profiles" or uneven measurements are put to work which violates any principle of mechanical gear design, also coinciding with the mentioned problems of design failures and harnesses. As a result, you get a problem from which you almost always blame the "welding" that put it by the way during its application in the mill lacks - in most - welding engineering.

HERDIZ Construction Proposal

At HERDIZ Construction we have engineering and automated welding procedures for crown repair, based on scientific studies and 30 years of experience, with average of more than 4,200 repaired units.

Once defined by the sugar mills the size and type of profile to be used in a "crown set" a detailed diagnosis of each unit is made to determine whether it is repairable or not and what the magnitude of the repair is.

Unlike "traditional" repairs at HERDIZ Construction we use automated welding processes with special welds. The selection of the welding process and the application of special welds is in accordance with the codes of the American Welding Society (AWS).

The use of computerized welding equipment ensures the quality of the repair and reduces the risk of failure. Essential aspects of the welding process such as introduced heat, amperage, voltage, feed rate, inductance and arc distance – which commonly depend on the welding machine and the welder's ability – are controlled by software.

Mixer process and welding technology safely allow to repair the teeth and correct the design failures in addition to increasing the life of the repaired horn and being able to apply the repair several times to the same crown.

The application of special welds allows to provide the contact area of the tooth mechanical, physical and chemical properties that cannot be made in the casting of the steel crown.

The surface finish of welded repaired teeth is done by grinding with machined abrasives and finally polished, achieving a rolling surface with low coefficient of friction.

These benefits, together, allow us to use discarded crowns as semi-products to have repaired crowns in better condition than new crowns since all manufacturing problems are corrected in the repair process.

Estimate

For reference, repair-exporting a "Crown Set" (3 units) can be estimated at \$17,400.00 F.O.B. Miami, including materials, work and other details involved in the cost of repair.

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