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Dividing Shears

R. DuFries

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TO: B. RIXHAM and As Noted  
DATE: 2 April 1987

FROM: R. DuFRIES  
MEMO: HERE'S THAT MEMO YOU WANTED. Jim.

SUBJECT: DIVIDING SHEARS

On the BELGO Contract, BBC has advised that 1:1 gearing on the Crop and Divide Shear results in the motor commutator bars being heavily loaded always in the same place, shortening the useful life. This had been previously complained about by GE in letter attached. We have "replied" to this complaint in the past by recommending the customer rotate the coupling a tooth or two on a periodic basis. Anyone who has done this knows it's an unpleasant task which could be easily avoided by designing the shear with a hunting tooth ratio.

In our continuing effort to "standardize on excellence", I suggest our "new standard" be designed in this way, and all proposals account for this requirement; so in the future the problem will not exist.

I GUESS WE HAD BETTER MENTION NEED FOR 1000 GEARS IN WRITE-UP FOR DIVIDING SHEARS IN FUTURE. NOTE: DRIVE MOTOR HAS TO BE ON ONE OF MIDDLE GEARS.
October 16, 1980

ERF-932

Morgan Construction Company
15 Belmont Street
Worcester, MA 01605

Attention: Mr. W. R. Ahlstrand

Dear Mr. Ahlstrand:

Subject: Commutator Rotation Considerations
For All Electric Start-Stop Divide Shears With 1:1 Gearing

In answer to your recent request that we investigate the possible need for special maintenance instructions on shears in which the motor is directly connected to the knife shaft, we have the following comments. The concern comes from the fact that in such shears the motor will always start on the same commutator bar. For some time, Morgan Construction Company has been advising customers to rotate motor couplings on a regular basis in order to spread the starting load to other commutator bars.

We have investigated known shears of this type which are currently in operation in order to determine if special maintenance instructions are necessary. In those installations it was found that some commutator burning and raised commutator bars were experienced when a shear was left on the same commutator bar for long periods of time. We are told that the customers in those known shear installations have begun a regular maintenance procedure of rotating the coupling between the motor and shear knife once every two months. The particular shear includes a toothed coupling which allows a movement of the brush holders by only a few commutator bars. This allows wide distribution of the load over various commutator bars. From this it would seem that a recommendation to rotate couplings at least every two months would be advisable.

A caution regarding this statement is in order. In the horsepower ranges in which these shears normally fall, most DC motors are of the 4-pole variety. This means that a coupling in which the number of bolts is divisible by 4 would not solve the problem since you would simply switch from one brush to another on this same commutator bar. Therefore, it would be advisable to have either a toothed coupling or a coupling containing a number of bolts which would insure moving the brushes to different commutator bars each time the coupling is rotated.

An
additional complication of rotating the coupling is that any pulse tachometers using marker pulses and attached to the motor would have to be realigned to return the marker pulse to the original position after the motor coupling was rotated.

In summary, it would be the recommendation of the General Electric Company that direct connection of motor to shear be avoided where possible. However, when such gearing is necessary toothed couplings—or couplings with a large number of bolts—should be used for such applications, and the coupling be rotated by one tooth or bolt at least every 3 months of operation. If bolted couplings were used, the ideal situation would be one in which the number of bolts is an odd number.

We trust that this letter adequately answers the question which you posed. If you have further questions or comments on this subject, please feel free to contact us.

Yours very truly,

E. Ray Ferree

E. R. Ferree/W. H. Lee
Hot Mill Application Engineering
Room 247C/Ext. 7883

rp

cc: W. H. Lee/GE, Salem
Is it practical to change a single motor electrically as above? This would vary the motor stopped position one tooth per each cycle.