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Electric Billet Shears

Stephen Ordog

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1 October 1964

Mr. William Murray
Morgan Construction Company
1 Central Street
Manchester 2
ENGLAND Via AIR MAIL

Dear Bill:

Electric Billet Shears

In reviewing the comments and suggestions in your letter of 24 September 1964, it seems that I failed to explain the problem adequately in my 3 September 1964 letter and concentrated too much on the solution.

The problem, as we have observed it on the Lackawanna and Johnstown Billet Shears, is that certain tail ends which are not long enough to be carried over by the swinging roller are likely to fall toward the crop pit in such a manner that their front ends rest on the knife holder while the back ends rest on the tail rod or on the last roll of the tilting section of the shear approach table. The lengths that seem to be a problem are between 4 and 8 feet long. This seems to agree with your observations as noted in the fourth paragraph of your letter of 24 September, except that the greatest length which seems to give trouble is 5 feet at Rheinhausen and is about 8 feet at Lackawanna and Johnstown.

Please note too that not all tail ends of these lengths fail to fall into the pit. Only an occasional piece does hang up on the shear but this occasional piece occurs often enough to be a matter of concern.

In closely observing the behavior of the tail ends that did fail to drop into the pit the sequence of events seems to be as follows:

1. The shear makes a cut and the knives begin to separate.

2. The lower knife, moving faster than the oncoming front end, moves ahead of the front end.
3. If the tail end is between 4 feet and 8 feet long the front end of it begins to drop as soon as the center of gravity passes over the last roll of the approach table. The distance between the last roll of the approach table and the swinging roller in its back position is approximately 4 feet 3 inches so the minimum theoretical length that can be carried over is 8 feet 6 inches. Of course shorter lengths will carry over because of their speed and the contact relationship between the front end and the swinging roller.

4. As the front end of a critical length tail piece falls, it sometimes drops onto the lower knife holder behind the knife.

5. As the shear continues its travel to bring the knives to a stop in the normal stop position, any one of three things may happen to the back end of the tail crop:

   A. If short enough it may drop from the support given by the last roll of the approach table and fall straight down into the crop pit.

   B. If short enough, it may drop from the support given by the last roll of the approach table and, as it falls, be deflected so that it falls on the tail rod. The tail crop then comes to rest in an angular position resting across the knife holder and tail rod creating a hazard.

   C. If the piece is too long for the back end to drop free of the support given by the last roll of the approach table, the shear comes to rest with the tail end in such a position that its front end is resting on the knife holder and its back end is up in the air, supported somewhat above its middle on the last approach table roll. This, of course, creates an extreme hazard to the oncoming front end from the next bloom.

From the above it appears that if the lower knife holder were to be maneuvered in such a manner that it would not be in a position to support the front end of the critical length tail pieces, then the problem would disappear. The solution presented on the marked-up sketch of 111222 would do this, since cycling the shear once more after the normal last cut would get the lower knife holder out of the way during the time required for the critical length tail ends to fall past the point where the lower knife holder usually catches them.
William Murray  
 1 Oct. 1964

Your solution of using a pinch roll mounted above the swinging roller would be effective for carrying over those tail pieces long enough to have their front ends reach the swinging roller but would still not correct the situation for those tail pieces which behave as described above.

Your reference to lengths of less than 14 feet is puzzling since the drawing and my letter referred to lengths between 4 and 10 feet long. We chose 10 feet as the upper limit to leave a margin above the longest problem lengths which appear to be about 8 or 8-1/2 feet long.

The solution we present, as devised by Ed Murrah, is a very simple one and requires no additional machinery to correct the situation. It does not, of course, overcome Rheinhausenen's apparent objection to discarding tail ends of length less than 8 feet or so and I realize now that choosing a length of 10 feet as the upper limit was the wrong approach for this case. The solution would, however, be no less valid using an 8 foot upper limit and Rheinhausenen may be willing to trade a slight loss of potential yield for the assurance of a solution to the tail end problem. I say potential yield because, even with the addition of a pinch roll above the swinging roller, only pieces long enough to bridge the gap between approach table and swinging roller without the front end dropping would be carried over to the runout table and this length is in the neighborhood of 8 feet on the Lackawanna and Johnstown shears.

I apologize for being so long-winded but I felt that a more thorough explanation was in order at this time. I do hope the above clears up any misconceptions created by my letter of 3 September and the marked-up print of 111222. We made a sepia of 111222 and marked the sepia to indicate the method proposed to correct the situation. Enclosed you will find one print of this drawing.

Sincerely,

Stephen Ordog

SO: jc
Encl. : 1 Print of 111222.
cc. to L. Peterheit(with encl.)
bccs. - W. H. Wigington
        A. C. Marsters
        Min. List