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AUTOMATIC WEIGIHING, PACKAGING AND HANDLING

Stanley Berg¹

Every bag of processed seed which leaves your plant represents time and money spent on your part. Labor and material costs have been involved to grow the seed, to handle it, to grade, to treat it.

You can think of that bag of seed as being an investment, which is sold to your customers. If that bag of seed were a bag of money you would be very cautious to make certain that the right amount were in it. Every coin would be counted, more or less carefully depending upon its denomination before it left your hands to be deposited.

The bag of seed is really like a bag of money. If it is not measured accurately, your profits can quickly slip by and be lost.

It is in the packaging operation, where the processed seed is weighed into the bag, that plant profits must be protected.

The bags shipped out have to be at least the stated bag weight; maintained as close as possible to prevent excess give-away. There is a real problem in meeting weights and measures requirements, and protecting customer good will--and at the same time preventing profit leaks from developing, especially if the packaging operation is a manual one.

Fortunately the packaging operation lends itself to quick analysis. Your present operation can readily be compared to improved ones indicating the savings which can be realized.

Some packaging operation costs are relatively fixed, the cost of the processed seed, empty bags, thread, tags. Other costs will vary depending on the type of packaging system used, labor contents and the amount of giveaway per bag.

Seed packaging operations range from completely manual, with high labor content per bag to highly sophisticated equipment, where at the high production rates the labor content per bag is very small. We will see that the greatest potential area of saving in going to automatic packaging equipment is in the improved accuracy of filled bag weights.

¹ Mr. Berg is Product Manager, Packaging Division of the Howe-Richardson Scale Company, Clifton, New Jersey.
Depending upon production requirements, as well as the cost of the processed seed, it is possible to choose the most appropriate equipment. Three basic classes of packaging equipment are made to serve the seed industry, each system with its own range of application for which it is best suited.

Let's take a typical packaging operation and analyze it. Obviously, the numbers which will be used are only representative. The analysis is perhaps oversimplified, but does illustrate the point. Example A analyzes a completely manual operation involving two men; one, sacking off the seed volumetrically from a bin, trimming to weight on a platform scale; the other, closing the filled bags, using a cable supported portable sewing head. Both men are hard pressed to maintain the required production. In an effort to make sure the minimum weight is placed in the bag, the weigher tends to give away seed.

We see that the variable cost of the yearly operation is $6010. The type of equipment which would be best suited for this operation is the semi-automatic one man bagging system (Figure 1). Example B illustrates the savings which could be achieved by its use.

In Example B the daily savings over the manual operation were about $72.00. Even in this case, with a relatively low cost seed, the major portion of the saving is in the increased accuracy. Within 30 days the equipment paid for itself. Given wheels for portability, the unit can be moved about from bin to bin to allow its use for a greater portion of the year.

If we take a more expensive product, let's say shelled peanuts, as an example, we will find that more sophisticated equipment is warranted. Again, let us say that our two men are performing the packaging operation at the same production rates. Example C illustrates the basic operation.

The daily variable packaging cost here is $321.60. In this case an automatic scale should be used which can achieve accuracy at ± 1 to 2 ounces at the required speed. Example D illustrates an analysis of its application.

Even with the higher equipment investment, the investment has been paid off in half the time because of the increased accuracy, and the higher seed cost.

The two scale units which have been discussed are completely mechanical in operation. Some seed packaging operations, either because of the high value of the seed, such as the more expensive hybrid
Example A
Soybean Seed Packaging
50# Bags @ $4.00/Bag

Daily Output 120,000 #
Bags 2,400 Units (Approx 6 BPM)
Cost of Seed/Oz. .005
Existing System - Variable Cost
Giveaway Per Bag 6 Oz.
Giveaway Per Day 6 x 2400 x .005 = $ 72.20
Labor Cost (2) Men $ 48.00
Variable Pkg. Cost/Day $ 120.20
Variable Yearly Cost (50 Days) $ 6010.00

Example B
Soybean Seed Packaging
50# Bags @ $4.00/Bag

Daily Output 120,000 #
Bags 2,400 Units (Approx 6 BPM)
Cost of Seed/Oz. .005
Existing System - Variable Cost
Giveaway Per Bag 6 Oz.
Giveaway Per Day 6 x 2400 x .005 = $ 72.20
Labor Cost (2) Men $ 48.00
Variable Pkg. Cost/Day $ 120.20
Variable Yearly Cost (50 Days) $ 6010.00

Proposed System one man bagging system Variable Cost
Giveaway Per Bag 2 Oz.
Giveaway Per Day 2 x 2400 x .005 = $ 24.00
Labor Cost (1) Man $ 24.00
Variable Pkg. Cost/Day $ 48.00
Variable Yearly Cost (50 Days) $ 2400.00

Daily Savings $ 72.20
Annual Savings $ 3610.00
Equipment Investment $ 2170.00
Payout Time 30 days
Figure 1. Equipment for a one-man bagging operation.
### Example C
Shelled Peanut Seed Packaging
50# Bags @ $15.00/Bag

<table>
<thead>
<tr>
<th>Daily Output</th>
<th>120,000 #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bags</td>
<td>2,400</td>
</tr>
<tr>
<td>Cost of Seed/Oz</td>
<td>.019</td>
</tr>
</tbody>
</table>

**Existing System - Variable Cost**

- Giveaway Per Bag: 6 oz.
- Giveaway Per Day: 6 x 2400 x .019 = $273.60
- Labor Cost (2) Men: $48.00
- Variable Pkg. Cost/Day: $321.60
- Variable Yearly Cost (50 Days): $16,080.00

### Example D
Shelled Peanut Seed Packaging
50# Bags @ $15.00/Bag

<table>
<thead>
<tr>
<th>Daily Output</th>
<th>120,000 #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bags</td>
<td>2,400</td>
</tr>
<tr>
<td>Cost of Seed/Oz</td>
<td>.019</td>
</tr>
</tbody>
</table>

**Existing System - Variable Cost**

- Giveaway Per Bag: 6 oz.
- Giveaway Per Day: 6 x 2400 x .019 = $273.60
- Labor Cost (2) Men: $48.00
- Variable Pkg. Cost/Day: $321.60
- Variable Yearly Cost (50 Days): $16,080.00

**Proposed System - one-man bagging system** Variable Cost

- Giveaway Per Bag: 1 oz.
- Giveaway Per Day: 1 x 2400 x .019 = $45.60
- Labor Cost (1) Man: $24.00
- Variable Pkg. Cost/Day: $69.60
- Variable Yearly Cost (50 Days): $3,480.00

- Daily Savings: $252.00
- Annual Savings: $12,600.00
- Equipment Investment: $3,645.00
- Payout Time: 14 1/2 Days
corn seeds, or clover, perhaps coupled together with high production requirements, from two to three times the output that we used in our previous examples, dictate the need for still more advanced equipment.

The most advanced equipment available for seed mill packaging operations incorporates the automatic feedback principle. High speed and highly accurate automatic weighing equipment is used in conjunction with a checkweigher and a basic weight trend computer to automatically keep bag weights within the guaranteed tolerance.

A typical installation of this complete automatic system is shown in Figure 2. Even a system of this complexity can easily be analyzed for cost savings and investment payout time.

Let's take as an example hybrid corn seed worth 36¢ a pound and a packaging operation with twice the production requirements of those we have discussed. This automatic packaging system pays for itself very quickly when compared with manual filling, requiring two bagging lines; Example E.

Even when this system is compared with two lines, each of which is using a one-man bagging system, within a full year's time the more sophisticated equipment pays for itself. Example F.

These various examples have shown that the two major factors in controlling costs in the packaging operation are weighing accuracy and production requirements. With the choice of proper equipment your profits can be protected by cutting down giveaway. You know the value of your seed and your labor costs. Using the same type of analysis, you can select the equipment best suited to your operation.
Figure 2. A typical installation of an automatic packaging system.
Example E
Hybrid Corn Seed Packaging
50# Bags @ $18.00/Bag

<table>
<thead>
<tr>
<th>Daily Output</th>
<th>240,000 #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bags</td>
<td>4,800</td>
</tr>
<tr>
<td>Cost of Seed/Oz</td>
<td>$.0225</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Existing System - Variable Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giveaway Per Bag</td>
</tr>
<tr>
<td>Giveaway Per Day</td>
</tr>
<tr>
<td>Labor Cost (4) Men</td>
</tr>
<tr>
<td>Variable Pkg. Cost/Day</td>
</tr>
<tr>
<td>Variable Yearly Cost (100 Days)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposed System - Automatic packaging Variable Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giveaway Per Bag</td>
</tr>
<tr>
<td>Giveaway Per Day</td>
</tr>
<tr>
<td>Labor Cost (2) Men</td>
</tr>
<tr>
<td>Variable Pkg. Cost/Day</td>
</tr>
<tr>
<td>Variable Yearly Cost (100 Days)</td>
</tr>
</tbody>
</table>

| Daily Savings | $642.04 |
| Annual Savings | $73,384.00 |
| Equipment Investment | $16,794.00 |
| Payout Time | 26 Days |
Example F
Hybrid Corn Seed Packaging
50# Bags @ $18.00/Bag

Daily Output 240,000 #
Bags 4,800 Units (Approx 12 BPM)
Cost of Seed/Oz. $ .025

Existing System - Variable Cost Two-one man bagging systems
Giveaway Per Bag 1 Oz.
Giveaway Per Day 1 X 4800 X .0225 = $ 108.00
Labor Cost (2) Men $ 48.00
Variable Pkg. Cost/Day $ 156.00
Variable Yearly Cost (100 Days) $ 1560.00

Proposed System Automatic Packaging Variable Cost
Giveaway Per Bag 1/2 Oz.
Giveaway Per Day 1/2 X 4800 X .0225 = $ 54.00
Labor Cost (2) Men $ 48.00
Variable Pkg. Cost/Day $ 102.00
Variable Yearly Cost (100 Days) $ 1,020.00

Daily Savings $ 54.00
Annual Savings $ 5,400.00
Equipment Investment $ 16,794.00
Payout Time 312 Days