

INSTALLATION OF THREE NEW AUTOMATIC BAGGING MACHINES
TO PACKAGE GRANULATED AND CONFECTIONERS TYPE SUGARS
AT THE C AND H REFINERY

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BY
JOHAN JONGENS

CALIFORNIA AND HAWAIIAN SUGAR COMPANY
830 LORING AVENUE
CROCKETT, CA 94525

ABSTRACT

Modernization of the C&H Refinery bag packing station equipment included the installation of three new Bemis Packers, and replacing all existing bag packers, which consisted of four (4) Bates 50/100 lb. valve bag packers, one Hinman 40/100 lb. open mouth bag packer and a Bemis 25 lb. open mouth bag packer.

Two of the new packers are set up to pack 50 and 100 lb. bags and one packer is set up for 25/40 or 50 lb. bags. The new packers provide for a pinch seal top closure of the bags.

INTRODUCTION

The existing Bag Packing Station at the C&H Refinery consisted of four (4) Bates valve packers for 50/100 lb. Granulated sugars, one 25 lb. Bemis Packer for the 25 lb. consumer bag, and one Hinman Packer to pack 40/50 and 100 lb. open mouth sewn bags. All this equipment was forty to fifty years old and required considerable maintenance, and parts were not always available.

The station required one operator for each of the Bates packers and 25 lb. Bemis packer, and two operators for the Hinman packer. All packers were operated on a daily basis except the Hinman packer which was only used for special customer orders. Operating rates for the Bates packer were 6 bag/min., for the Bemis 18 bags/min. with frequent breakdowns, and the Hinman packer at 6 bags/min.

JUSTIFICATION

The need to replace the various types of fifty year old Granulated sugar packers was prompted by a variety of reasons:

1. Obsolescence of existing equipment, difficulties and/or unavailability in obtaining spare parts
2. Increase in marketing demands with a choice of adding capacity versus replacement with new higher capacity units
3. State of the art equipment would offer cost advantages, less manning and higher capacity.
4. Innovations in packaging materials offering different closing methods, improved image to consumer or use, reduced cost and tamper proofing of valve bags
5. The new C&H AS/RS Warehouse facility created demands for package sizes that would fit within the limits of the pallet loads to be stored

SELECTION OF EQUIPMENT

For the selection of equipment that would fill our needs, several manufacturers of high capacity automatic packers were contacted. Proposals from three manufacturers were received, Bemis, Howe Richardson and Newlong.

Bemis was selected based on the following factors:

1. Packing rate - Bemis slightly higher than the other two
14-15 bags/min for the 100 lb. bag
18-20 bags/min for the 25 and 50 lb. bags
2. Cost - Bemis lowest cost
3. Delivery - two equal, Newlong longer
4. Service available - Bemis advantage, all equipment made by one manufacturer, past experience with their company good
5. Spare parts - about equal with Bemis having advantage of supplier for all equipment
6. Floor space - Bemis required least space - 18 ft. x 7 ft.
7. Performance guarantees - all equal \pm 1 oz. on 95% of weightments
8. Package sealing - all similar
9. Degree of automation - all similar
10. Operating or maintenance skills required - Bemis slight advantage

GENERAL DESCRIPTION OF THE INSTALLATION AND EQUIPMENT

The Bemis Packers are all installed on the second floor of our Packing House and they are each equipped with the following equipment:

Scale: Series 6140 Microcomputer Bemiscan Duplex Scale

Packer: Series 7115 Automatic Bag Hanging/Handling System

Sealer: Series 4602 Aero-Seal Closer

Discharge Conveyor: Following the sealer, each packer has a conveyor with two bag kickers to divert the bags onto two main belt conveyors going to the Warehouse.

Sugar Supply: Consists of four various size bins from 9 to 30 ton capacity from which the sugar is distributed by two feed scrolls or two rotary feeders to three vibrating scalping screens, FMC Model BL3008, located above each of the packers. The screens discharge into a feed hopper above the packer scale.

Sugar Recovery: The recovery system for spilled sugar is provided by a grating and hopper under the fill spout area of each packer. The sugar is transported with a scroll and chutes to a central main scroll and elevator for sugar return to remelt.

OPERATION OF EQUIPMENT

Empty bags are placed on the bag magazine of the 7115 packer. Based on bag size, magazine holds from 250-300 bags. The packer will pick up empty bags, one at a time, and feed the bag via rollers into the vertical positioning mechanism. The bag then transfers to the filler spout, is picked up, opened and then filled by the 6140 scale. A mechanical bag settling device settles the sugar. Bags are held securely during the filling cycle and then passed on to the closing conveyor infeed, with the bag gussets tucked in and held in place. The filled bag is then passed on to the 4602 sealer where V belts convey the bag top through, between creasing rollers to set the fold line, and fold the bag top 90 degrees. The bag enters above the hot air nozzle where hot air at about 350 degrees F activates the pre-applied adhesive, and then passing through a series of compression rollers to compress the fold and seal the bag. Bags are sealed at 60 FPM through the sealer.

All the packers' operations are controlled by an Allen-Bradley PLC model #SLC150, which is programmed to analyze malfunctions or to make changes in the various operational functions.

The 6140 scale is a two module net weighing scale, equipped with electronic load cells which send the signals to the Bemiscan Data Center, which controls the various functions of the scale. Sugar discharges through a clamp type bucket scale operated pneumatically. An automatic "no bag/no product" device is provided

to prevent the scale from discharging product unless a bag is present and ready to receive the product.

The data center is in a floor mounted console located at the operators convenience and is capable of maintaining up to ten user-programmable programs. Programming is simple and can be tailored to meet desired applications. The ability to retain vital information allows the operator to analyze the full production run, such as down and run times, weighment history, total errors, number of units under and over weight can be analyzed and used to achieve maximum efficiency.

The new packers can be easily converted to pack different bag sizes. Changes between 50 and 100 lbs. or 25 and 50 lbs. take approximately 30-45 minutes. All that has to be adjusted are conveyor height and rail changes on the sealer and product discharge conveyors, and in the packer changes are: bag magazine pick-up, bag positioner and bag settler platform height.

There is only one difference between the two packers for the 50 and 100 lbs. and the one packer for 25 and 50 lb. bags. The scale discharge opening with bucket gates is smaller on the 25-50 lb. packer. However, these parts can be interchanged between packers or parts can be purchased to change a packer to a different size opening. With the present set-up of the three packers, any combination of bag size is possible. For instance, all packers can be packing 50 lb. bags or one packer each can pack 100 lb., 50 lb. and 25 lb. bags.

SUMMARY OF RESULTS

- 1. ROI - sufficient to justify the capital investment
- 2. Manning - Bates Packers - 4 operators/shift
1 Partial Mechanic
1 Partial Electrician
25 lb. Bemis Packer - 1 operator/shift
Hinman Packer - 2 operators/shift or occurrence
New Bemis Equipment - 2 operators/shift

The two packers for the 50/100 lb. bags are a left hand and a right hand packer, which allows one operator in the middle to serve both packers. The third packer the 25-50 lb. is a right hand packer, with one operator, which could assist the first operator if needed.

The new Bemis operators have been trained to do light mechanical work encompassing trouble shooting, replacing parts, light repairs routine and preventative maintenance, as well as sanitation duties are carried out by the same personnel.

- 3. Weight Performance: Old equipment standard deviation 1.78 and 2.73 average overweight
New equipment standard deviation .97 and 1.10 average overweight

Reduce Sugar giveaway by about 30%

Also a reduction of losses in sugar transfer into the bags, which is a problem with the Bates valve packers.

4. Reduction in Maintenance and Sanitation: No sugar leakage with pinchtap closure. Valve bags leak sugar onto conveyors and equipment.
5. Savings in Bag Cost: Pinchtap closure bags cost less than valve bags resulting in a 20% cost reduction.
6. Quality Assurance: Valve bags are not in infestation or tamper proof. Pinchtap bags are totally sealed.
7. Excellent Safety Features