

WHAT IS THE LATEST IN CONE AND SEED
HANDLING EQUIPMENT AND TECHNIQUES

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New techniques have been developed to meet the needs of the changing seed industry. For many years a great amount of low cost wild seed was collected, handled in bulk, or bags, and processed in large lots. Now with the increasing number of seed orchards, the seed is of high cost and is collected in small lots which require special handling. In the past when a handful of seed was spilled on the floor, we always swept it up because we knew it was enough to buy a coka-cola. Now when the same amount of orchard seed is spilled, if the true cost were known, it would probably be enough to send two people to Hawaii on a vacation for a week.

The changing industry has placed the following demands on the existing techniques of handling and processing cones and seed:

1. New techniques for handling, shipping, and storing cones prior to processing.
2. A new design for a dry kiln in order to dry small lots of cones as well as large ones and maintain the identity without contamination.
3. Improvements on the flow process of seed through the plant for more efficient and effective cleaning.

HANDLING, SHIPPING, AND STORING CONES PRIOR TO PROCESSING

One of the major problems in this industry has always been the physical handling of cones prior to actual processing. This problem has been solved with a new materials handling system involving the use of wirebound pallet boxes. These boxes, used as a single container for handling, shipping, and storing, are delivered knocked down but can be assembled in less than three minutes as needed. Prior to the introduction of the wirebound system, burlap bags were used. These bags presented a number of problems. They would tear and rot if rained on. The biggest and most costly problem was filling the sacks and handling them. Bulk handling was also used. The problems with bulk handling are somewhat the same as those with burlap bags, inasmuch as it requires a lot of time and labor to load and unload the trucks. Now with wirebound boxes, the people who harvest wild cones will bring them to the collection station, measure them in a basket and dump them into boxes. Formerly the cones were dumped

into a big pile which had to be removed frequently because of the heat build-up in the cones. Whether burlap bags were used or bulk handling with conveyors the loading process normally required four or five men. With wirebound boxes the entire loading procedure can be accomplished with one man and a fork lift. Besides the savings on time and labor it is easy to maintain the identity of the cones by marking the wirebound boxes. The cones can be left at the collecting station longer because there will never be over twenty bushels of cones in one pile or box, and the cones will have adequate ventilation. The wirebound boxes can be used just as effectively when collecting cones in the seed orchards.

One man can distribute wirebound boxes before the cones are ripe. After the boxes are filled one man and a fork lift can handle all of the loading on any standard flat bed truck, twenty four hours a day, rain or shine. A standard forty foot trailer can carry two rows of boxes, stacked two high which equals 1,040 bushels of cones. When the cones arrive at the processing plant, one man and a fork lift can unload the boxes and place them in storage. The identity is maintained along with accurate measurement. Wirebound boxes, stacked three high, provide adequate ventilation and are always ready for inspection. One man and a fork lift can take the cones out of storage at the usual rate of twenty bushels at a time. Each box holds twenty bushels of cones and if used four times the cost equals about 10 cents per bushel or about the same as burlap bags. The savings are realized through the reduction in cost of time and labor.

HORIZONTAL DRY KILN

Most of the kilns built in the past were designed to process large lots of wild seed. They generally do a good job drying cones but are almost impossible to clean. The latest in design is a long horizontal kiln with small bins, eight feet high, that is designed to process and maintain the identity of small lots as well as large ones. The bins have removeable trays which eliminates the need for conveyors. The front panel of each bin is removable. After the trays are removed with the open cones, the bins are ready for cleaning. The floor of each bin is on ground level which provides easy access. With the front panel removed, light can reach every corner of the bin which makes the cleaning process as simple and as effective as cleaning a small well lighted empty room. The bins are cleaned with a vacuum after each lot is processed to prevent contamination.

The kiln is equipped with portable heaters, which have all the necessary safety controls that are usually incorporated into stationery heating systems. The portable heaters are rotated each day when unloading the kiln. Through this rotation system the hottest air is always on the driest cones allowing cooler air on the greener and less mature cones for twenty four hours before receiving any heat. The static pressure and air flow is controlled throughout each bin. The combination of portable heaters and controlled air flow provides effective and efficient drying.

The cones are poured from the wirebound boxes into the trays of each bin by one man using a fork lift with rotating forks. Each bin is equipped with a time card holder for the purpose of documenting the date and time of drying as well as maintaining the identify of each lot. This time card follows each lot throughout the plant.

IMPROVED FLOW PROCESS

When cleaning seed there is one thought that should be remembered throughout the process, as Dr. James Delouche of Mississippi State says, "Seeds are alive and they are no good to anybody dead". In order to keep seed alive, when processing, the main factors to be controlled are temperature, moisture content and mechanical damage. These factors are controlled better through a new flow process involving new variable controls on existing machinery. Most of the cost of seed is prior to the extraction and cleaning. This makes the loss in yield of live seed very costly. To make sure at this point, that all the seeds are removed from the cone an effective tumbler is needed. The latest in design is a continuous flow rotary tumbler with a variable speed and tilt that is set for each species. The speed determines the rolling and pitching effect of the cones while the tilt determines the length of time the cones remain in the tumbler.

A seed polisher is used to remove half of the wing and a wet dewinger for the rest of the wing. A wet dewinger is not new but there are many variations in design. One of the latest is a large tank with slow moving pipes that gently agitates the seeds. About 1/2 gallon of water is used in the wet dewinger per one hundred pounds of seed. The wing absorbs the moisture and readily turns loose from the seed coat. More effective separations can be made with seeds that are completely dewinged. The seeds do absorb some moisture and have to be dried. In the horizontal type dry kiln there is space provided to dry seeds of high moisture. The humidity and temperature are such that the moisture content is reduced slowly and held at the desired level until the seed is removed.

A cleaner with three screens and air is used for scalping, cleaning, and removing empty seeds. This machine seems to be the most popular one used and is probably the most versatile for its size. If this machine is used for scalping, cleaning, and removing empty seeds, some of the pulleys should be changed in order to vary the speed of the feed, the shake, the knock, and air.

When scalping, the controls should be set for a fast feed, fast shake, hard knock, and low air. This will keep the bracks hopping and prevent the screens from clogging. This operation removes all of the large materials and dust. When using the machine for cleaning, after the seeds have been wet dewinged, the controls should be set for a medium feed, medium shake, medium knock, and medium air, to completely clean the seed and remove all of the chafe. After the seed is wet dewinged, cleaned, and dried to a low moisture content it is once again put through the cleaner with the controls set for a slow feed, slow shake, light knock, and high air. If the seed is less than 10% in moisture content the cleaner should give a clean separation between full and empty seeds.

These techniques for handling cones in wirebound boxes prior to processing, the horizontal type dry kiln, and improved flow process, will better serve Southern Forest Industries needs for quality seeds and custom processing.