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FLORIDA COOPERATIVE EXTENSION SERVICE

PACKINGHOUSE NEWSLETTER

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CONTINUOUS VS. BATCH DEGREENING

It is time for a new thought with regard to degreening.

Many improvements in citrus degreening have been made in recent years[a]. However, these changes have been in the form of improvements of a basically inefficient system in that degreening is a "batch process" supplying the packing line which is a "continuous process". This was no real problem as long as degreening rooms were small and hand methods were largely employed.

The improvements noted above include not only matters of the design of degreening rooms, but also of the physiological reaction of the fruit to conditions from the tree to the packinghouse line via the degreening room. Our work over the past 20 years, but particularly detailed studies in the last two seasons by Andy McCornack, have shown that fruit condition is enormously improved and decay and/or peel injury losses decreased by getting fruit from the tree into a humid atmosphere and then from that humid atmosphere to the waxer with minimum delays. The development of very large pallet box rooms has greatly increased these delays as it takes so long to load a room and then to bring it to temperature (which is automatically a period of humidity stress). Once the room is opened, there is more fruit than can be handled rapidly by the packing line so that degreened fruit degenerates during the time from the opening of the room to the time when it is waxed on the packinghouse line. With degreening rooms as large as 5, 6, or 7 thousand boxes, these problems can become acute.

Obviously, continuous degreening is called for; and we have been working with a number of packers checking out improvements that would make this possible. In particular, a year's experience at Haines City Citrus Growers Association has shown that with our new "wall duct" design, pallet box degreening rooms can be run partially filled without any loss of degreening efficiency. Knowing this, it is possible to design a single large degreening room that can be started on the first day of the season and run continually until the end of the degreening season. The only real grounds for having other rooms is to hold already degreened fruit under high humidity conditions when the packinghouse is not running, e.g. over the weekend.

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[a]See Packinghouse Newsletters 5, 6, 7, 18, 19, 22, 25, 33, 35, 39, 40.

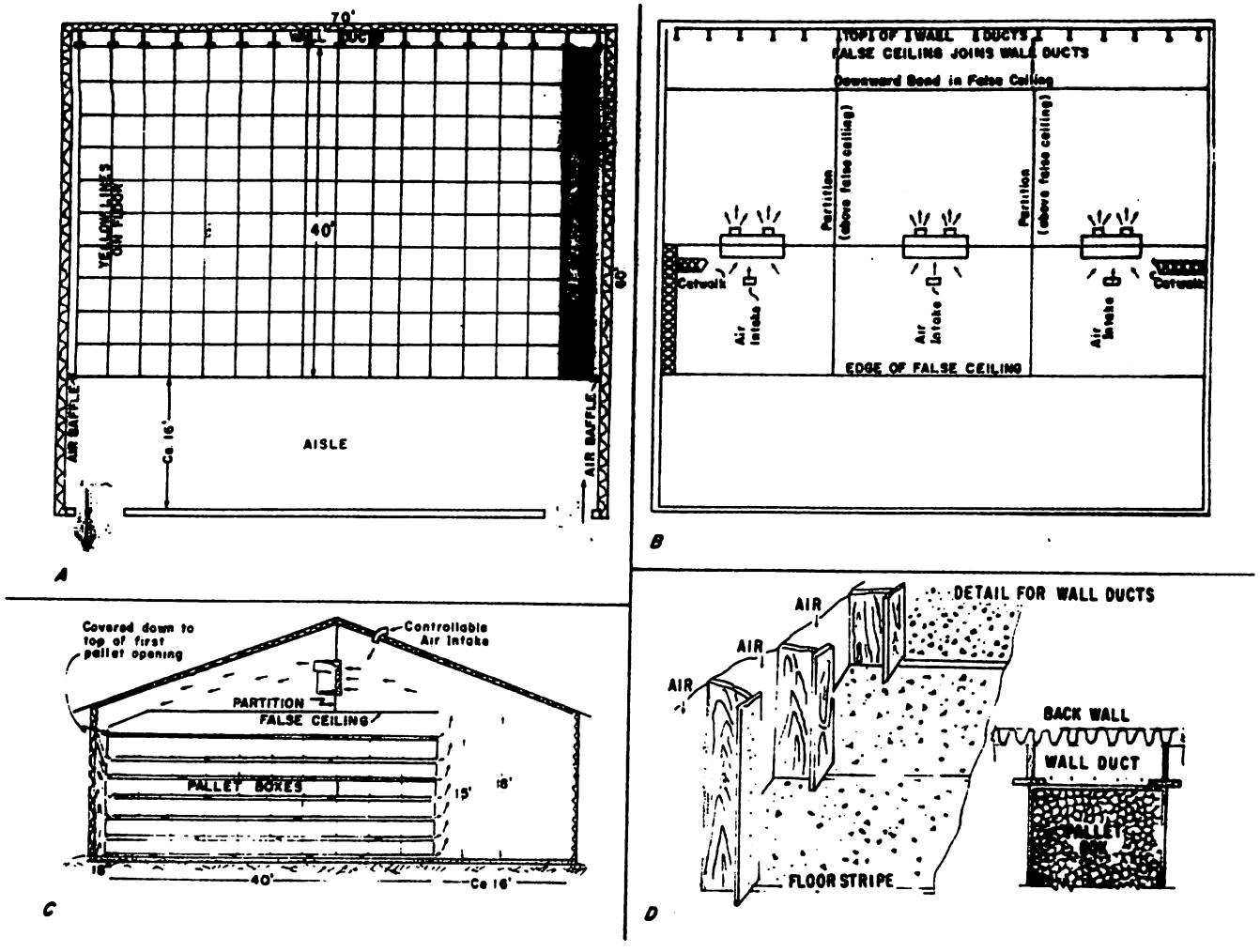

Figure 1. Large degreening room for continuous operation

The basic design of such a room has been drawn up. At least one, and perhaps several, such rooms are expected to be built this summer.

Figure 1A shows the general lay-out of a proposed 10,000 box (1,000 pallet box room). In actual practice, this room would hold up to 960 pallet boxes, leaving a 16-foot aisle which should be considered minimal for rapid fruit handling. One more stack, 6 pallet boxes high, could be added to each row slowly and carefully to make a minimum of 1,120 pallet boxes for special occasions.

Construction costs are cheaper the nearer a building approaches a cube. This lay-out is intended to utilize this principle and still provide practical fruit handling. The type of building is barely indicated. A center ridge roof building is shown here, but this design can be adapted to other roof types. The type of building must be designed around the function, not vice versa. A so-called "fink truss" design is particularly suitable.

A false ceiling is used, above which are the air handling units. The space between the false ceiling and the roof serves as a pressurized plenum directing air into the wall ducts running down the back wall. Figure 1B shows a plan view at the level of the false ceiling. This false ceiling can be made of any material that makes an air barrier. Providing the joints are lapped in the right direction, very light aluminum sheeting works well. Above the false ceiling, partitions separate the air handling units. There are no partitions in the room itself. The false ceiling is sloped down at the back (Fig. 1C) to reduce turbulence as the air enters the wall ducts.

The wall ducts themselves (Fig. 1D) can be made of any material, but in the design we have tested, 2" x 10" lumber from an old packinghouse was used and admirably combined the rolls of air duct and a stop for the fork lift truck. Note that there must be no curb at the back wall which would prevent air passing through the pallets of the bottom layer of pallet boxes. The wall ducts should be sized to match the rows of pallet boxes and be deep enough to keep air velocities down to approximately 1,000 feet per minute where the air enters the duct.

Details of fan capacities, location, and types of controls are not covered here. However, it is necessary to mention that extremely high humidity is essential and should be controlled within narrow limits (e.g. 95 to 98% RH). A suitable system might be a steam jet humidifier downstream from each fan unit and a small pneumatic water nozzle humidifier in each wall duct with a selective temperature control as described by D. L. Deason in Newsletter #40. An ethylene analyzer will also, of course, be essential to regulate ethylene between 1 and 5 ppm; however, the more progressive packinghouses are already equipped with these.

Two air doors are shown[a]. Two air doors placed on the same side of the room will work well if they open into another building. If they open to the outdoors, a single large air door in the middle of the wall would be more efficient, but should be equipped with good traffic mirrors for safety. If air doors are put opposite each other on end walls, they will not work efficiently.

Obviously, the base design of this room is eminently suited to use as a cold storage room when not in use for degreening. However, an initial decision must be made as to whether this room will ultimately be a dual purpose room used at different times for degreening or refrigeration. We regard this dual use as advisable but an initial decision must be made as to whether this room will ultimately be used only for degreening or for both degreening and refrigeration. If it is to be a dual purpose room, construction must take this into account from the beginning. It is very expensive to go back and rework a degreening room for later refrigeration.

Operation of the room can start with the picking of any amount of fruit. We advise test degreening of sample lots of early fruit, particularly 'Robinson' tangerines[b]. From the time these sample lots are run, the room runs continually with scheduled checks for ethylene analyses[c], temperature, and humidity. As soon as any fruit is picked it can start coming in, perhaps a boat-load at a time if

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[a]Later note. The air doors turned out to be quite unnecessary. 28 October, 1980.

[b]See Packinghouse Newsletter No. 25

[c]See Packinghouse Newsletter No. 26

the grove is close at hand. Each row (running from one wall duct) is treated as a lot of fruit and after a while fruit is moving in and out steadily instead of being degreened in batches.

An increasing number of fresh fruit shippers have had us put on conferences in the Harvesting and Handling Section to discuss packinghouse modernization plans. We suggest this as an excellent first stage for anyone wanting to go into this new approach on degreening. Call us in good time, and we will try to set up a conference between anybody you care to bring, including potential suppliers if you wish, and those of our staff who are technically involved. Just give us enough time ahead to arrange the meeting.

W. Grierson
Professor
Horticulturist

OCCUPATIONAL SAFETY & HEALTH ACT (OSHA) DISCUSSION FOR THE CITRUS INDUSTRY

A discussion of the implications of OSHA to citrus organizations sponsored by Polk County Extension Service is scheduled 1:30-3:30 PM, Tuesday, May 23, 1972, at the Polk County Extension Office, Bartow. Guest speakers will be Art Garrison, District Safety Supervisor, Florida Department of Commerce, and William Gordon, Area Director, OSHA, U. S. Department of Labor, Jacksonville. With State and Federal representatives present, all questions relating to OSHA will be welcome. See Packinghouse Newsletter No. 44 for the recordkeeping requirements of OSHA.

W. F. Wardowski
Extension Service

"ANOTHER CONTEST"

"Mrs. Diane Biddinger of Perrinton wants to start a contest.

"She bought a sack of grapefruit labeled "seedless". In one grapefruit she found 67 large seeds.

"Who will bid 68?"

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This newsletter is published at a cost of $80.40 or 7¢ per copy, to give the latest news to the packinghouse industry.

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