Greenhouse Safety - For Plants and People Alike[1]

K. L. Goldsberry[2]

Abstract.--Discusses greenhouse safety in several areas including: construction, weather, fire, equipment, storage areas, temperature, and pesticide and herbicide applications.

I'm sure that most of you are confronted with all types of safety programs almost every day. Even though our society has become safety conscious in the last decade, I'm sorry to report that those involved in the greenhouse industry have the general attitude; "There are no hazards around a greenhouse, at least the one where I work."

I would like to take a few minutes and touch on some parameters of safety which the greenhouse industry should consider.

CONSTRUCTION

A greenhouse should be designed for the geographical location, climatic conditions, and type of crop to be grown, plus the dead, live, wind, and snow loads. Each factor must be considered independently and combined.

Greenhouse construction should not only be considered from the safety standpoint, but economically. The leading greenhouse insurance company has recently modified their rates because of the snow losses for the past 2 years. There are approximately 50 greenhouse manufacturers throughout the United States and Canada. If a grower is seeking a new greenhouse, he generally makes the dollar signs his first priority and sees how many square feet he can get for his construction budget--thus, he will contact most of the manufacturers. As circumstances would have it, a Texas grower will buy a "Georgia" built house because it's the cheapest. On the other hand, a Michigan grower may also purchase a "Georgia" house for the same reason. But, he finds, as does the insurance company, that it won't withstand the loads and collapses.

The insurance company has thus divided the country into zones and based their rates on the different designs. Zone 1 (southern USA), zone 2 (mid-America), and zone 3 (in the snow fall area). A greenhouse designed for zone 1 and built in zone 1 will have a rate of $0.50 per $100 evaluation. A zone 1 design built in Wisconsin will have a rate of approximately $4/100. A house designed for zone 3 and built anywhere will have a $0.50/ 100 rate. The better greenhouse pays off in the long run.

WEATHER

Fort Collins, on July 30, literally felt the hail--ranging from pea to softball size. Fifty percent of the glass in glass-covered houses was lost. When hail starts, no matter how small the size, get out of a glass house. As far as that goes, remove yourself from any greenhouse because softball-sized hail goes through any greenhouse cover and apparently we never know when it will accompany a hail storm. We now can testify that FRP and polyethylene-covered houses can be torn apart by hail too. There is less damage inside, but people can be injured, so get out.

Wind can create another safety condition. If any cover starts to separate from the-super-structure during high winds, don't try to get on top of the cover to hold it down--you may take your first magic carpet ride.

FIRE

Fire is always a possible problem around a greenhouse. For some unknown reason, the boiler room is an excellent storage place for paint, fertilizer, oils, pesticides, and even gasoline! Need we say more? In our knowledge most greenhouse fires have started through carelessness in construction, maintenance, etc. The greenhouse flammability film tells the complete fire story. There is one suggestion--develop a fire drill program and practice it!

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[2]Department of Horticulture, Colorado State University, Fort Collins, Colorado.

MISCELLANEOUS HAZARDS

Cooling fan equipment and their electrical parts should be considered. Fans covered, small enough to keep fingers out of the blades, is a must. When the fan relay cover is removed, don't forget to put it back properly.

Storage areas, whether they are inside or out, should be kept clean and orderly. Accumulated trash around the greenhouse is an ideal place for fire to start and feed on FRP cover.

Spots around the greenhouse are often taken for granted. How often have you stumbled over a hose, shovel or the threshold in a greenhouse? Has a door been slammed shut by the negative pressure of the exhaust fans and the glass broken? If management will take a minute to develop some equipment policies or fix something that broke today and not wait a month (year or never) an injury may be saved.

Preventive maintenance is an excellent safety factor. How soon will a door jam rust out completely or a supporting column post rot off. Inspections, light, or heavy maintenance have been shown to save money and injuries.

Temperature control has several broad applications including the houses for crops and energy conservation. Safety involved? You betl Temperature controls must be properly shielded for best sensitivity or there will be improper plant temperature (not safe for plants). Sensing elements exposed to the sun will cause the cooling fans to stay on too long or the heaters not to operate and the air temperature will become too cold. We recommend that all temperature sensors be aspirated with air moving at least 125 feet per minute.

Some greenhouse operators steam pasteurize their growing media. When employees get involved, make sure they know when and how to check temperatures. It's easy to get burned or ones lungs full of steam if the cover is taken off too soon.

Greenhouse cover problems versus high temperatures. It isn't exactly safety, but it is worth saying a few words. Greenhouses left unvented in the summer suffer. Thermo degradation occurs and the covers turn dark. Yes, plastics of any type are not safe in high temperatures. Their useful lives, as far as light transmission is concerned, will be shortened. PVC pipes are also affected by solar energy-when exposed, they become brittle. A hailstone came through the cover and shattered one of ours.

Delamination of Tedlar. During the past decade, Tedlar, a polyvinyl fluoride film developed by DuPont, has been applied to the surface of certain fiberglass-reinforced plastic panels (FRP). Some companies have had trouble with delamination within months, 2 or 3 years, or even 10 years. DuPont's research indicates the film, which prevents FRP weathering and fiberbloom, will have a life of 20 to 25 years. If the base panel, film, and method of application are not compatible, delamination occurs. To our knowledge, only one FRP manufacturer has had little or no delamination in the last 5 years. Check the track record of each company when you are looking for Tedlarcoated FRP.

Pesticide application involves many safety factors around the greenhouse. First, use certified applicators that have the background needed to apply the pesticides you need. The company should make sure that they have at least two people certified. Know what pesticide is required for specific insect control and after it is used, how long before employees may reenter the contaminated area. By the way, when an applicator has his mask, hat, boots, and other special covers on, do you send a second person to observe the pesticide application procedure? You should! If the applicator tripped and was knocked unconscious while doing his or her thing, it could possibly mean "curtains" for them. Develop a buddy system when applying hazardous materials.

Herbicide problems for greenhouse growers are becoming more and more common. One cannot use just any weed killer around the greenhouse; most of them are highly volatile or may have an unwanted residual effect. "Roundup" has proven good for many needs in the greenhouse. One does have to use a plastic or stainless steel spray applicator because the material is highly corrosive.

Several growers have purchased soil from farmers or other suppliers and found plant problems. Data has shown that bales of peat shipped in rail cars that had previously been used for 2,4-D shipments became contaminated. one grower with a shallow well found the Dicamba had percolated into the groundwater. For safety's sake, try the bean test. Plant five or six pinto bean seeds in every new batch of growing media and see how they germinate and develop the first set of true leaves. It is also a good indicator for shallow well water.

The greenhouse operator must not only consider the safety of the employees, but the health and well being of the plants. In many instances, what is a hazard for people will affect plants and vice versa.

The movie film, "Understanding Greenhouse Flammability," can be rented from: Film Library, Audio Visual Services, Colorado State University, Fort Collins, Colorado 80523. The fee for the 20-minute sound and color film is $20.