Evaporative Cooling Pads Burn

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The causes of greenhouse fires have been numerous. Each fire has involved some specific material that has contributed to the rapid spread of fire. Black shade cloth has caught on fire when a mum lighting system shorted. Natural gas filled a greenhouse when a newly installed line broke at a threaded point, because of undue stress on the line. Ignition and rapid flame spread occurred when the gas reached the pilot light of an adjacent gas fired unit heater. Electrical wires in a junction box were apparently improperly taped, causing a short which led to the melting of a hole through the cover and ignition of a head house where ammonium nitrate was stored. The first fiberglass reinforced plastic (FRP) covered greenhouse fire in Colorado was started when welders failed to see and extinguish a smoldering spot in a tinder dry excelsior cooling pad caused by falling hot metal from their torch.

In the early 1970's, Colorado State University, Department of Horticulture researchers began evaluating all the potential facets relating to greenhouse flammability. One of the areas involved materials used for greenhouse cooling pad systems.

New and used aspen and aluminum laminated paper pads were installed in a greenhouse used for controlled burning. All three types of pads burned rapidly upon ignition and created enough heat to cause the FRP covering to burn, leading to the destruction of the complete greenhouse cover.

Sections of Cel-dek and Kool-Cell cooling pad materials were recently burned to determine their susceptibility to ignition and flame spread. They were not placed in a greenhouse pad frame, but stacked on the ground in a manner that would allow free movement of air around each section of pad (Figure 1). The base of two sections were lighted with a match. Upon ignition, flames quickly spread to the apex of the stack.

Sections of a hog-hair type cooling pad were used in a final small scale evaluation. The material was relatively difficult to light with a match, but ignition finally occurred. Flame spread was very slow, with no air movement. When air was

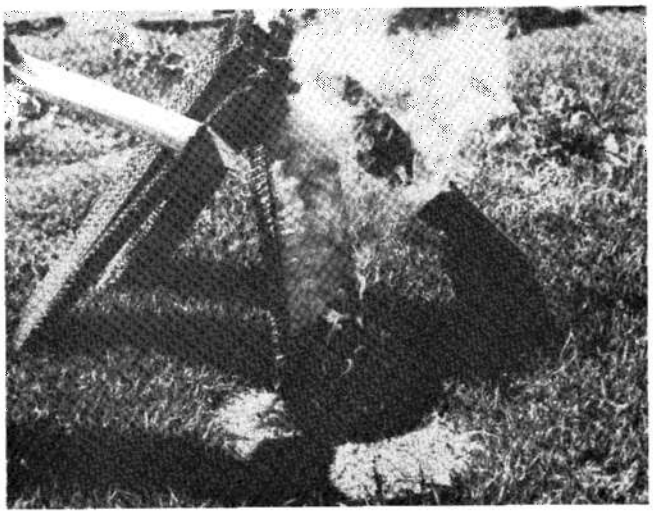

Fig. 1: Two and four inch thick pieces of cell-dek and Kool-cell being burned to evaluate their ignition and flame spread characteristics.

moved through the pad, flame spread increased, but gradually became almost self extinguishing with a reduction of air movement.

Discussion

All known present day evaporative cooling pads will burn. Pads made of aspen excelsior and/or paper products will burn rapidly, creating intense heat which could start a chain reaction or contribute to extensive damage.

The new cell type pads appear to support and perhaps contribute to the burning process because of their design. The small angular flutes and corrugations tend to create a chimney effect and the heat and smoke move rapidly up the pad.

It appears that the hog hair type pad is the hardest to ignite and has the slowest flame spread of all materials evaluated. However, when installed in the greenhouse, the responses might be totally different.

Greenhouse operators must consider the possibilities of fire starting in the cooling pad area. Prevention is of primary importance . . . keep electrical circuits weatherproofed and in good condition, don't use or have any type of fire around the pad system (designate as a non-smoking area), use sheet metal or other nonflammable materials as a divider or cover over a pad system and acquaint your employees with a fire prevention and control system.

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