Waste Watchers: Building To Save Energy

In tune with conservation, officials at Windyke Country Club in Germantown, Tenn., put their building plans to concrete use, constructing maintenance facilities that would save money over the long haul.

Their commitment to energy efficiency is reflected in the club's new 8,000-sq.-ft. turf equipment maintenance facility overlooking one of two 18-hole courses at Windyke. It features skylights, fiberglass insulation and zoned-heating.

"An energy-efficient building initially is more expensive to erect," Joe Patton, co-superintendent of maintenance, remarked, "but it'll pay off in the long haul. We've cut our power consumption nearly in half."

Patton and co-superintendent Jim Harris predict other courses, especially those operating on narrow profit margins, will dictate energy-efficient design when building new maintenance centers, golf car sheds and clubhouses. Facts back them up. Energy costs last year alone skyrocketed an average of 55 percent nationwide.

"We're not the first golf course to see the light," Patton said. "And we won't be the last."

Even if the utility industry fulfills meteoric energy needs by expanding at a six percent annual rate through 1989, power rates will never return to pre-energy shortage levels. Power plant expansion will raise, rather than lower, kilowatt-hour costs due to spiraling construction expenses, environmental legislation and the price of mortgage money.

"Heating, lighting and insulation obviously require more attention than in the age of low-cost fuels," Patton noted. "But every cloud has a silver lining. A comfortable environment insures maximum efficiency by mechanics performing precision work on turf equipment."

Except for usually overcast days, when fluorescent fixtures must provide supplemental light, 15 strategically-placed skylights induce up to 100-footcandles of illumination inside Windyke's modern service facility. Less illumination reportedly could retard employee productivity and higher levels would be needlessly wasteful.

"Skylights are a far cry from what we had before," Harris asserted. "I doubt we turn on the lights more than once every ten days or so. But in the old barn we had to burn them every minute of the working day. That's like burning money."

Supplemental lighting is provided by heat-by-light fluorescent strips mounted in recessed eight-foot fixtures above work stations. Fluorescent lighting produces 50-80 lumens per watt and is at least twice more efficient than mercury vapor or incandescent sources. Incandescent fixtures in the old shop, for example, produce just 20-23 lumens per watt.

Harris, Patton and club owner Earl Dykema know that uniformly spaced skylights and ceiling-mounted light fixtures do not guarantee well-distributed lighting. For example, the footcandle level near walls may be only half of what it is at the room's center, and in corners, as low as one-fourth the central-room value. Unbalanced lighting levels can distract mechanics from their tasks and cause eye fatigue.

"The walls in our shop are painted white to minimize and compensate for different lighting levels," Harris said. "It seems like a small thing, but it really boosts employee efficiency. We're profiting from mistakes we made in our old building."

White or other soft-colored walls reflect 60-80 percent of light falling on them. Medium-colored finishes reflect 30-60 percent and dark walls reflect less than 30 percent of illumination hitting them. In general, as reflectance increases, so does utilization of light.

Windyke's all-electric maintenance building is divided into four heating zones to prevent cold or hot spots. One zone — encompassing employee lockers, a lunchroom and the superintendent's office — has thermostatically-controlled central heating and air-conditioning.

Zones within the shop and storage sections are serviced by three vertical fan-forced heating units. The fans recirculate heat emitted by fluorescent fixtures. Each roof-suspended heater can be operated manually to maintain comfortable 65-68° F. temperatures throughout the building. The two superintendents said fan-forced electric heating is an inexpensive method of warming large shops.

"Actually," Patton observed, "gas heaters provide the quickest recovery of heat lost by repeated closing or opening of multiple overhead doors. But LP gas is too expensive and commercial hookups rapidly are becoming anachronisms due to the natural gas shortage."

A large turbofan, equipped with an automatic-closing damper to prevent backdrafts, assures proper ventilation and cooling inside Windyke's new maintenance center. Clean air is required because of fumes from welding and gasoline-powered turf care equipment.

During summers, with the fan operating and three 12-foot overhead doors open, a continuous flow of fresh air moves through the shop to cool mechanics. Energy-draining air conditioning is not required even on blistering summer days.

"Our old barn had a metal roof and the temperature often reached 110 degrees inside it on really hot

Building

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days," Harris commented. "On those days we had to close the shop and mechanics helped out with course maintenance. A person could barely exist, let alone work, inside the shop."

One of the three 12-foot overhead doors is located inside the building. It separates the main shop from adjoining space where equipment is kept while awaiting repair or preventive maintenance. Other overhead doors are located on the building's east and south sides. During winter, when equipment is moved into or out of the building, the shop door remains closed. It is never raised to receive or remove equipment while an exterior door is up.

"This system minimizes heat loss in the shop by preventing warm air from escaping directly outside," Harris said. "Instead, when the shop door must be opened, warm air remains inside the building."

Perhaps no energy-conservation at Windyke has produced a more substantial payoff than fiberglass insulation throughout the maintenance building's walls and ceiling. Insulation prevents wasteful loss of heat by conduction through walls, doors, ceilings, floors and windows. Insulation, plus the ability of materials to resist heat flow, holds the key to energy conservation.

The steel-frame maintenance building features brick, air space and eight-inch concrete block construction. Two-inch fiberglass with vapor barrier fills the cavity between walls. An insulation system provides as much heat loss resistance as 32-inch concrete block construction.

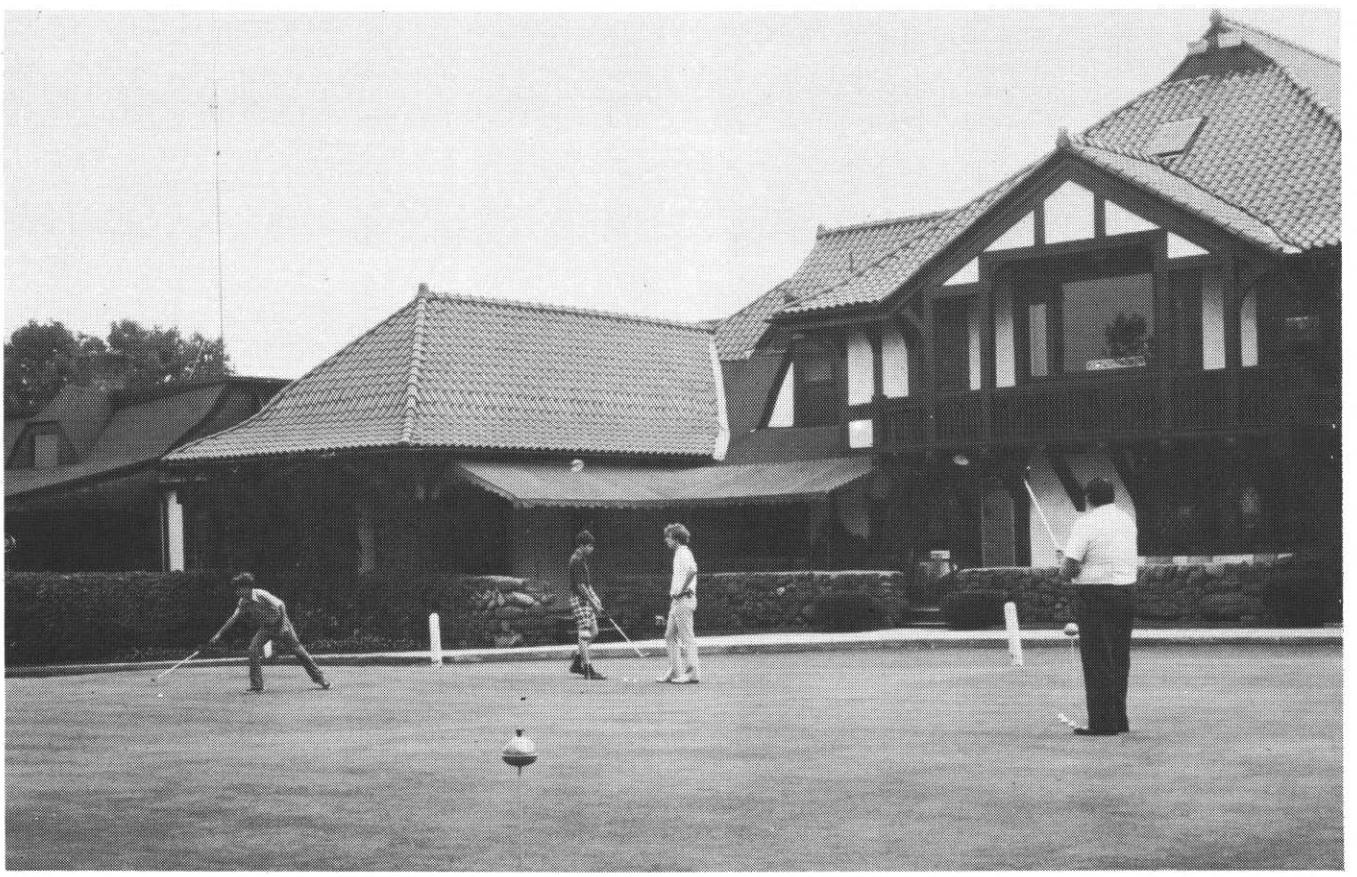
The building's metal ceiling is insulated with a core of polyurethane foam insulation. Metal ceiling systems with polyurethane form insulation, according to a recent government study, provide maximum energy efficiency. Warm air is retained so well, Patton said, that his shop's heater must be on less than one of every ten winter days.

"Insulation is expensive but Dykema didn't cut corners in erecting this building," Patton said. "But even if a guy is operating on a tight budget, he'll be penny-wise and pound foolish by trying to skimp on insulation."

The federal study backs Patton up. With energy costs soaring upwards, the study notes, investment payoffs within five years are becoming the rule rather than the exception with insulation.

Golf course officials interested in upgrading energy efficiency of existing brick veneer, concrete block or pre-cast service centers can do so easily by firing walls and installing insulation. For example, a superintendent whose shop consists of six-inch thick brick walls can double its energy efficiency by installing two-inch polystyrene board along with one-half inch thick gypsum board.

Devoting almost a year in the planning of the new building, Windyke officials prove it pays to plug into energy conservation. □



Even in older buildings, added insulation can cut heating and cooling costs significantly. By upgrading insulation in brick veneer or concrete block structures, energy efficiency can be doubled. Infra-red photographs can even be taken of the structures to see where heat is escaping.