Pesticide Storage: One Step Ahead

Proactive is always better than reactive. This is especially true with the planning and construction of a pesticide storage building.

by GARY W. BOGDANSKI

WHERE does a superintendent begin when planning to construct a new pesticide storage facility? With no definite regulations established concerning pesticide storage, a superintendent may feel somewhat bewildered as to what is considered *proper storage*, and may wonder if an existing or planned facility meets the requirements of future regulations. Many guidelines and regulations touch on various aspects of a complete pesticide storage/handling facility, but the rules differ from state to state and agency to agency. Because the existing pesticide storage area at The Sharon Golf Club was outdated, a new pesticide and fertilizer facility was constructed using a proactive approach to the design.

Getting Started

Our first step in planning the new pesticide storage facility was to formulate a design that fit the needs of the golf course. Needs were discussed among many golf course personnel, and we reviewed the Material Safety Data Sheets (MSDS) of the particular chemicals stored at The Sharon Golf Club. MSDS aid in defining the type of storage that is required. In our case, the local fire department, zoning department, and county building department govern the actual building structure that is required, based on what will be stored. I designed the storage facility by using a computer-aided design (CAD) system. CAD facilitated the numerous changes that were made to the design before the final presentation. I drew a very basic design after reviewing the guidelines offered by a number of information sources. I then solicited input on the design from all agencies that had jurisdiction regarding this type of facility. We also considered the laws of other states, since it is possible that some of these laws may be implemented at some point in the future.

After studying all of the recommendations, I updated the basic design, which resulted in a complete, final blueprint consisting of 12 sheets. Electrical, plumbing, construction details, and even shelving locations were drawn on the layout. These details were very valuable in visualizing the final building. After presenting our final design to the County Building Department for review and approval, a building permit was issued and the contractor began construction.

The Facility

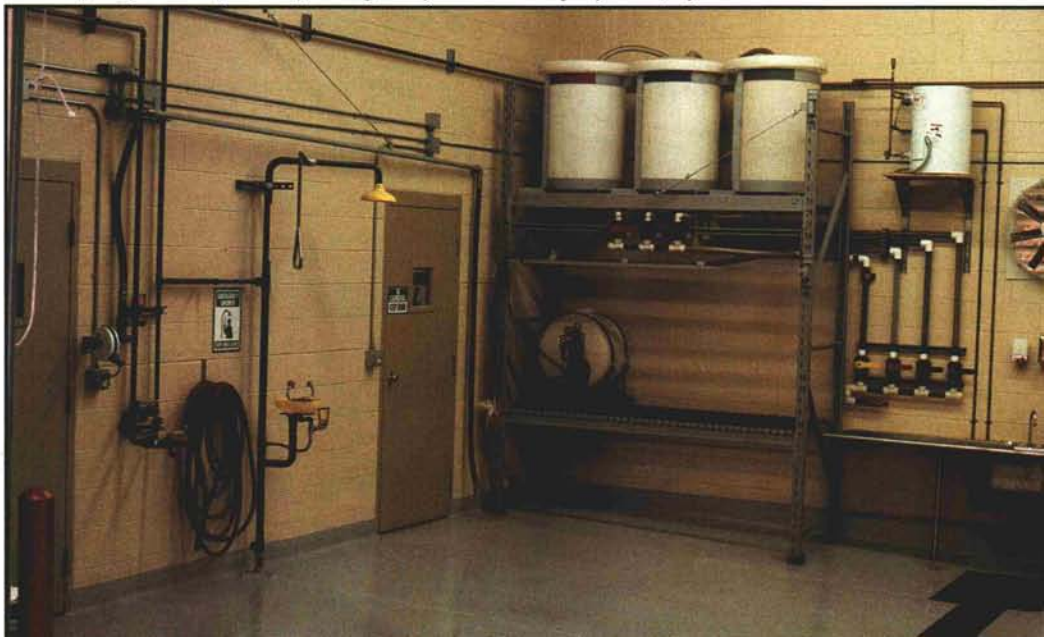
The new facility at The Sharon Golf Club is located approximately 140 feet from the maintenance complex. Adequate separation addressed two concerns: first, that operations in this building do not involve other maintenance activities, and second, to eliminate the possibility of a fire spreading from building to building. Only authorized personnel have access to the pesticide storage building. The building was constructed with masonry block with a stick frame wood roof structure and plywood decking. The 1600 square feet consists of four rooms: two pesticide storage rooms, a mix-load area, and fertilizer storage. Block walls isolate fertilizer storage from the pesticide area. The walls separating all of the rooms extend completely to the roof decking to act as a fire stop.

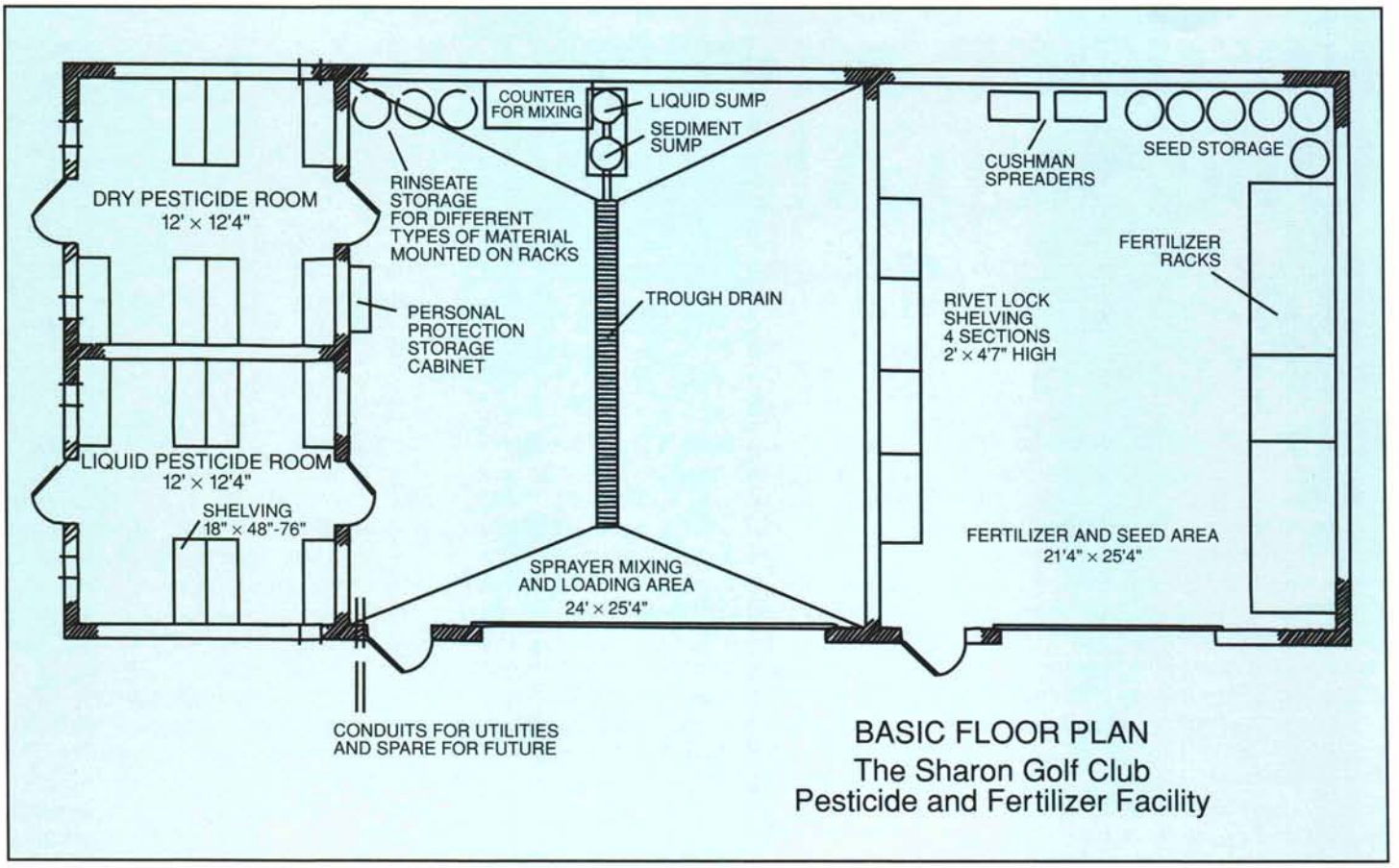
The building is entirely self-contained, with no outgoing drains. Each room has a ventilation fan wired to the light switch. Signs placed on the outside walls are used to define each area as to pesticide or fertilizer storage. Telephone and alarm systems are provided to the building.

Pesticide Storage Rooms

Both pesticide storage rooms are identical in design with the exception of electric heat added to one room, allowing winter storage of any unused pesticide. By having two separate rooms, pesticides can be isolated in several different ways: dry or liquid, fungicides, insecticides, and herbicides. Pesticides are stored on steel shelving.

A well-organized mix-load room in the pesticide storage building not only improves efficiency, but greatly adds to employee safety.





BASIC FLOOR PLAN
The Sharon Golf Club
Pesticide and Fertilizer Facility

Each room has two sets of doors. One door opens directly into the mix-load area. The second door opens to the outside, which is a fire code requirement.

Each of the two pesticide storage rooms has a six-inch step-down, secondary containment area that is capable of holding 500 gallons. The floors and the first six inches of the walls are a monolith concrete, pour-coated to protect it from pesticide exposure. A Tennessee Valley Authority acceptable concrete coating of phenolic epoxy was applied in four layers for a total of 15 mils thick. The first two layers are colored differently from the top coats. This color difference allows a contrast to appear if the integrity of the coating begins to wear thin.

The ceilings of the pesticide storage rooms are two layers of ⅝" fire code drywall. Even though the majority of substances stored are not combustible, the ceiling does provide a fire wall. Here again, the MSDS determines the type of construction.

To achieve the best possible air flow, we exceeded the minimum ventilation requirements set by OSHA. Our state division of safety and hygiene was helpful in suggesting appropriate methods. Each room has a corrosion-resistant fan connected to the light switch that is mounted outside the room. Positive ventilation is then assured upon entering the room. The fans are ducted to within 16" of the floor to remove vapors that are heavier than air. Natural ventilation is achieved by the placement of open louvers mounted through the block wall. The louvers in the storage rooms have fusible links that close in the event of fire.

Mix-Load Area

The mix-load room is used to fill the sprayers and collect rinseate for recycling. The room is large enough to accommodate parking of all the application equipment. The concrete floor is coated with the same phenolic epoxy, but sand was added between coatings to provide a non-skid surface. The saw-cut joints are filled with an epoxy caulk to seal and maintain a secondary containment system. This containment area can hold about 600 gallons. An article by Ronald T. Noyes on the specifications of mix-load pads and rinseate systems is included in the MWPS 37 publication (see source table).

The floor is sloped toward the center, to a stainless-steel trough that is connected to a stainless-steel sump. The uniquely designed sump is a double-lined, stainless-steel double sump. An inspection tube, permitting visual verification of a sump leak, is located between the sump and outside lining. The first sump is a settling sump with a strainer basket to catch large debris. An overflow pipe located near the bottom of the first sump allows rinseate to flow to the second sump, from which a pickup tube runs to a stainless-steel transfer pump.

Three 55-gallon tanks constructed of high-density polyethylene are mounted on an overhead rack. Tanks with conical bottoms were used to allow for complete drainage of the tanks and any settled particles. By having more than one tank and separate valves for each tank, the rinseate can be segregated into such categories as fungicides, insecticides, herbicides, or any possible combinations of materials. Keeping the tank size small ensures quicker processing rather than accumulating large amounts of rinseate. Because we used translucent tanks, the amount of rinseate can be verified at a glance. The rinseate is pumped up into the tanks and dispensed via gravity. An overhead boom can be swung out and placed in the spray tank. When the appropriate

valve is opened, the rinseate tank is emptied. A fourth valve can be used to pump rinseate directly from the sump to a spray tank. Irrigation water is used to fill spray equipment utilizing a different overhead boom. The end of the boom has a droop hose with a cam lock fitting, and couples directly to the sprayer's anti-siphon valve.

The mix-load room is equipped with an emergency shower, eyewash station, and first-aid kit. A stainless-steel counter and sink provide an area for small container mixing and hand washing. All plumbing fixtures drain into the rinseate sump. A frost hydrant was installed for cold weather use. The potable water used to supply the building is protected by a back-flow prevention device. Future plans include an open mixing system to process water-soluble fertilizers.

Fertilizer and Seed Storage

The majority of fertilizer used at The Sharon Golf Club is granular. In Ohio, regulations for this type of fertilizer are very basic. The material is to be stored indoors on a dry, impermeable surface. Previously, we stored fertilizer where the equipment was parked. This type of storage frequently resulted in the equipment damaging the fertilizer bags and spilling fertilizer. By including the fertilizer storage in the new building, the material is isolated from damage. The fertilizer storage area is consistent with typical warehouse storage.

We allowed plenty of area around the building for delivery truck unloading. Along one wall is an 18-ton capacity pallet racking, allowing for fertilizer pallets to be stacked with a fork lift truck. On the opposite side of the wall, steel shelving with a three-ton capacity is used to store individual bags. All of the fertilizer application equipment is stored in this room. Seed is stored in metal garbage cans that provide protection from rodent damage. Each can is labeled as to the type of grass seed. A hanging warehouse scale is used to measure out small amounts of seed or fertilizer. This area is furnished with an emergency eyewash unit.

Conclusion

The construction of a modern pesticide facility is directly related to the type of material to be stored. From the MSDS various requirements can be determined: for example, fire protection systems, special electrical requirements, community right-to-know, emergency planning, and employee handling procedures. We keep one copy of the MSDS where the product is stored and another at the maintenance building office. A good way to start on a new facility is to make a list of possible information sources and then contact them to ask questions and solicit information. Use this knowledge to develop your own storage facility. Even though our new facility incorporates more safety features than are required by Ohio laws, we want to be one step ahead.

GARY BOGDANSKI *is the equipment manager at The Sharon Golf Club in Sharon Center, Ohio. He's responsible for the maintenance of all equipment and buildings at this northern Ohio club.*

Sources Contacted for Guidelines on Pesticide and Fertilizer Storage at The Sharon Golf Club

The sources shown are to be used as a guide only. Contacts will vary according to the state and county in which you are located.

Source	Guidelines Received
EPA's Pesticide Program implemented by the Ohio Department of Agriculture.	Regulates the EPA's Pesticide Program concerning use and storage, Ohio pesticide law
Golf Course Superintendents Association of America (GCSAA) Lawrence, Kansas 66049	Quinn, Patrick. "Standards for Pesticide Storage Buildings," *Golf Course Management*, July 1990
	Golf Course Superintendents Association of America, Pesticide Storage Facilities, Greentips fact sheet
Medina County Emergency Management Agency Sharon, Ohio	Emergency response planning, National Fire Codes
Midwest Agricultural Chemicals Association (MACA) P.O. Box 2125 Northside Station Sioux City, Iowa 51104	Booklet: "The 'How To's' of Agricultural Chemical Storage"
Midwest Plan Service (MWPS) Iowa State University Agricultural and Biosystems Engineering Dept. 122 Davidson Hall Ames, Iowa 50011	Kammel, David, R. Noyes, G. Riskowski, and V. Hofman. "Designing Facilities for Pesticide and Fertilizer Containment," First Edition, 1991. MWPS-37 publication
Sharon Center Fire Department Sharon, Ohio	State and local fire codes
St. Paul Fire and Marine Insurance Co. (The Sharon Golf Club insurance company)	Received information and input from the Risk Management Department
State Division of Safety and Hygiene Ohio	State funded, on-site consultation service addressing OSHA issues
Tennessee Valley Authority (TVA) Environmental Research Center Muscle Shoals, Alabama 35662	Broder, Michael F., and D. T. Nguyen. "Coating Concrete Secondary Containment Structures Exposed to Agrichemicals." Tennessee Valley Authority, June 1995. Circular Z-361.