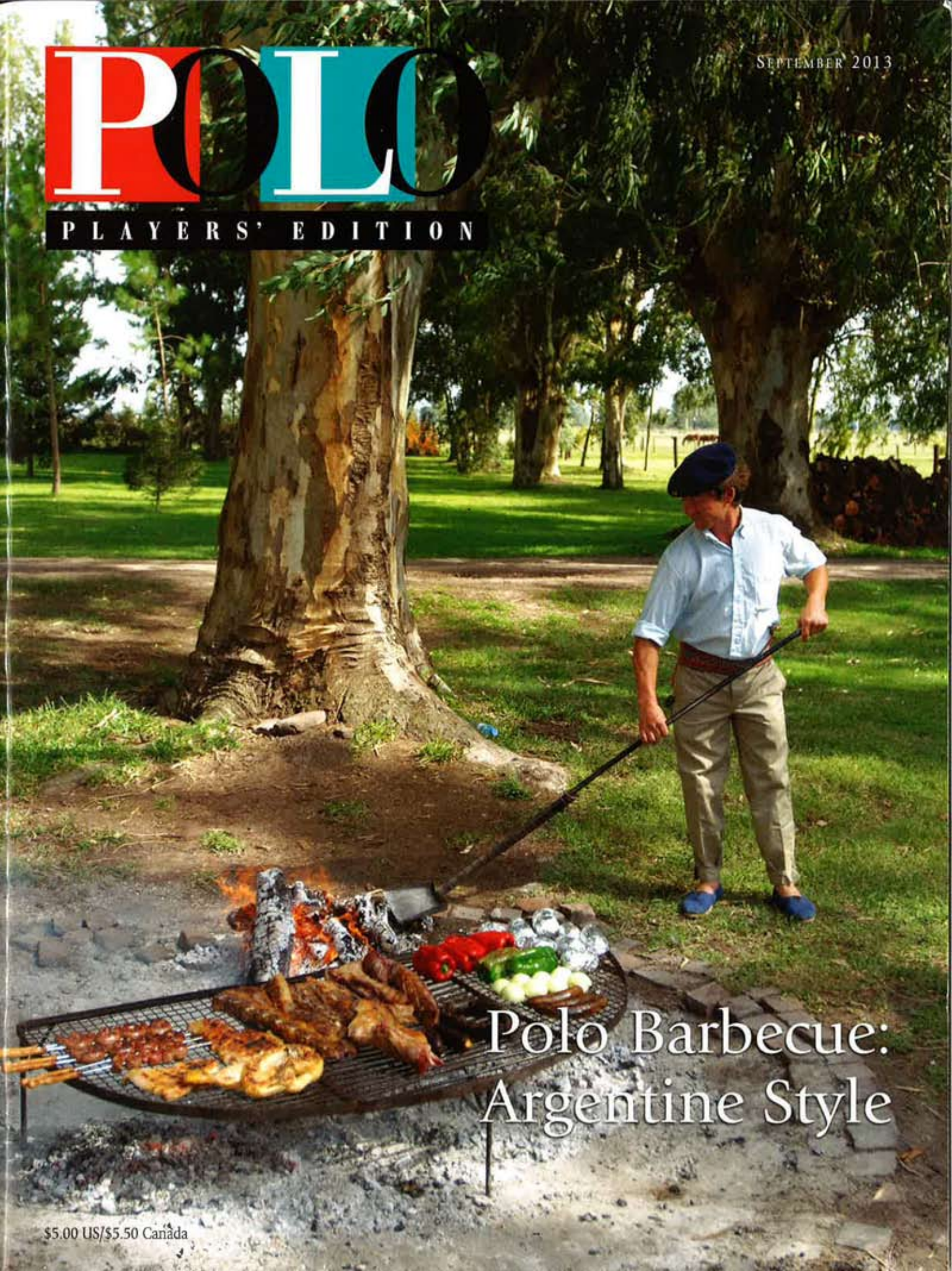


# POLO

PLAYERS' EDITION

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## Polo Barbecue: Argentine Style

\$5.00 US/\$5.50 Canada

# Fire Wind Water

Thoughtful barn design may reduce disaster risk

By Steven Rizzo

Ever since Hurricane Andrew, considered the most expensive natural disaster of its time, few South Floridians break ground on construction without consulting building codes and best practices regarding hurricanes. The lesson learned then, if there was any to be learned, is that building cheaply can prove very costly when a structure is ripped apart and must be built all over again. So in an area particularly prone to the occasional hellish deluge, it is common sense to build structures capable of handling high wind loads, errant missiles and possible floods.



Skylights can reduce the need for electric lights and box fans, reducing risk of electrical fire.

While residents of other states have little to worry about tropical cyclones, no place in the country is safe from its own brand of natural disaster. Clubs in the Northeast lived through Hurricane Sandy's high winds and flood waters last year, polo operations in states from Pennsylvania to Oklahoma have been affected by high winds and fearsome tornadoes and fires have licked polo barns from California to Florida. So when it comes time to build a barn, do it right the first time. Assess the dangers associated with your area, and build a barn that lasts.

When building a barn to resist the elements, a good first step is to consult with a professional designer or architect, particularly one that knows horses.

In areas with a history of hurricanes, tornadoes and high winds, there are a number of construction and design options to maximize the barn's durability. For one, the layout of a barn can affect the barn's overall strength. Some builders will recommend a center-aisle design over more open designs. Greg Linehan, of Wellington-based Linehan Builders, says "center aisle stables can be protected from wind uplift by closing up all openings—if the wind does not get into the building, damage will be minor."

But John Blackburn, of Blackburn Architects, P.C., says he prefers shed roof style barns, which are open on one side. Blackburn described one such barn he built in Florida. "We designed a barn that used hurricane gates," he said. "It had no windows in it, but was a concrete block reinforced building. We designed it so it would remain open for ventilation most of the year, and then when there is a tornado or hurricane in the vicinity, they would roll down the hurricane gates on the openings, which cover the entire face of the stall to the exterior, so it's protected."

Windows and doors should also be accounted for. According to Linehan, "[it is] imperative to use impact glass and window frames" for windows or skylights. Linehan also recommends "solid core exterior doors installed with hurricane resistant bucks and fasteners."

The construction material will also widely affect the building's strength. While wood construction is often the least expensive option, wood structures are much more susceptible to storm damage. That is why most builders in areas prone to high winds recommend designing barns in masonry such as concrete or concrete block. Whether concrete or concrete block, however, Blackburn advises it be reinforced. "Take



This barn's rear wall is constructed of masonry, and can work as a firewall in emergencies.

a concrete block building, which typically has joint reinforcing maybe every two or three courses. What I would do is... fill the cores of the block with a mixture of concrete and rebar reinforcing—vertical reinforcing as well as horizontal reinforcing—then tie those rebars into the foundation. That can make for a much stronger barn."

Concrete is also advantageous in reinforcing the roof. "There are ways you can design a roof to be tied down to a

reinforced concrete or concrete block wall barn that would give you significant strength," Blackburn notes. A tighter anchor for the roof is very important, as roof covering failure is typically the most widespread damage observed after a major storm. Doors and windows should be made of impact-resistant materials.

The roof design may also affect a barn's strength in high winds. According to Linehan, "hip roofs are better than gable end roofs. [They are] easier to wind



Roof damage is by far the most common result of hurricanes and windstorms. Typically, air gets under the roof and pushes up, ripping the roof from the walls.



Gabled roofs can take a beating during hurricanes, and must be reinforced with braces.



One of the biggest dangers in high winds is stray debris picked up by wind.

proof." Likewise, FEMA advises "the end wall of a [structure] with a gabled roof takes a beating during a hurricane, and those that are not properly braced can collapse, causing major damage to the roof." Barns with existing gabled roofs can be braced by securely fastened 2x4s. As a general rule, low-sloped roofs are better than peaked roofs for mitigating high winds.

Additionally, Blackburn suggests "one of the biggest problems with hurricanes is that flying debris is one of the biggest causes of damage, such as roof shingles, things flying off

buildings ... all of those various things that tend to fly around and hit and damage things." Accordingly, Blackburn suggests simpler designs are safer, as features like copolas can cause greater damage to the roof and create more debris in very windy storms. Ceramic roof tiles can also pose serious risks if they become loosened from the roof, as high winds can turn them into unpredictable missiles. Options like wood shingle or asphalt tile are less dangerous.

Concrete structures are also preferable when it comes to fire safety.

"Absolutely concrete—CBS," said Linehan when prompted about the best materials for fire safety, "the less wood the better." Linehan also noted "exterior wood in South Florida is always a maintenance problem" due to the high humidity and risk of termites.

Wood barns are less expensive, but are an obvious fire risk. That risk can be abated somewhat by the use of fire retardant treated wood, or the application of fire retardant coatings to your existing wood barn, but concrete is always preferable. It should be noted, however, that fire retardant coatings must be periodically maintained with regular reapplications.

Like with storm safety, good barn design can help reduce fire risk. The storage of dry goods like hay or shavings should be relatively isolated from the stabling sections of the barn. To that effect, Blackburn advises against designs including haylofts. If there is a hayloft, he advises that it only be a seven-day storage in the barn. "If there is hay storage in the barn and it's a bulk storage," he added, "I would isolate that if I could in a concrete block structure so if a fire gets started either in the hay storage or in the other part of the barn that you've isolated them."

Firewalls or masonry partitions can be very effective in controlling the spread of fire and smoke. Blackburn says he prefers to design barns with service areas in the middle and stalls on either side, then "put a fire separation between the stall area and the central service core."

In general, Blackburn tries to design barns with maximal natural ventilation and natural lighting. "The design of the barn, how you place the barn on the site, the openings and how you create where air gets in and where air gets out ... turns it into a ventilation- and light-producing machine. So you have very little use of fans, because it ventilates vertically and naturally. And you have natural light throughout the barn ... completely lit naturally all day long without electric lights."

Blackburn continued, "You still have [electric] lights because you have got to be there at night, so we still provide the lights, but you just don't have to depend on them as much." Aside from the inherent risk in having more electrical appliances running, lights tend to collect debris like cobwebs and bird nests, while box fans can spark or get caught up with dust and dirt, all of which increase the potential for fire. "If you can do as much of that naturally and vertically," Blackburn asserts, "then it's a safer and a better and a healthier barn."

Electrical wiring should be in conduits or BX cables to prevent fraying. Additionally, Blackburn installs explosion-proof outlet covers in the barn and places prone to fires like hay lofts. These have special gaskets to prevent dust and dirt from collecting inside the junction box and causing a fire or spark.

Many fire safety devices are on the market to significantly reduce fire risk. Builders agree that no barn should be without smoke alarms or heat detectors and, in climates prone to lightning, lightning rods. While sprinklers are also an option, many forgo sprinkler installation due to cost; sprinklers may also tend to freeze in northern climates. Blackburn also sometimes uses infrared detectors for places like hay lofts if the barn includes one.

Among the most important design features for fire safety is the presence of immediately accessible exits, unimpeded by tack or clutter to allow quick evacuation. "Sprinklers, smoke detectors and lightning rods are all helpful," said Linehan, "however quick egress is the most important." He continued, "The more exits, the better. No stall [should be] too far away from an exit."

Electrical wiring should be inspected and maintained at least once a year by a licensed electrician for aging, weathering, damage by rodents and general wear. Likewise, areas prone to cobwebs buildup or bird nests should be cleaned thoroughly at least once a year, as these may be combustible.

Surrounding landscaping should also receive a frank assessment. Clear any shrubbery from around the exterior of the barn and make sure dead vegetation



Brandywine polo club is currently raising money to rebuild barns recently damaged by tornadoes.



Explosion-proof outlet covers and roll-down hurricane gates are some options for mitigating the risk to your barn posed by fire and wind damage, respectively.

is not able to pile up. While railroad ties may add a rustic touch to surrounding landscaping, they are often coated in creosote, a type of tar, and may accelerate combustion. Gas vehicles like cars, trucks and tractors should not be parked near bedding or hay, and gas powered machinery should be stored outside the barn at all times.

If you are planning on building a new barn, you should communicate any concerns or needs to your builder. "Provide your builder with a floor plan," Linehan suggested, "[and] rely on the builder to properly engineer it."

But when it comes to storm and fire safety, it is important to remember there is no such thing as a perfectly safe barn. "There's no way to guarantee that any of it will be there if you get ... a Katrina hitting it directly, or one of the tornadoes we saw in Texas and Oklahoma this past year," Blackburn said. "But you can do things to preserve it, to keep it hopefully standing up in most cases." ♦

Blackburn's book on barn design, "Healthy Stables by Design" is forthcoming in September 2013.

healthystablesbydesign.com