News

PUBLIC SAFETY

Eight light poles nationwide have fallen recently

Some engineers say faulty engineering may be at least partly to blame in two Central Texas incidents.

By Eric Dexheimer, Andrea Lorenz
AMERICAN-STATESMAN STAFF
Sunday, April 12, 2009

On April 1, a maintenance worker was on the Sanger school district's baseball field when he heard a loud crash nearby. One of the 75-foot stadium light poles had pitched to the ground, shattering the giant lights.

Sanger students were in class at the time, and no one was hurt, said Jack Biggerstaff , superintendent of the district just north of Denton. The next afternoon, as a worker was removing wires from the fallen post, a 90-foot light pole toppled to the ground by the adjacent football field, missing the 4,000-person capacity stadium.

Large galvanized steel poles, which typically are rated to withstand 90-mph winds, should last decades before needing replacement, structural engineers say. But the Statesman has found that in seven separate incidents since 2007 — and six times in the past six months — eight large athletic lighting poles towering over public school facilities made and sold by the same Texas companies have crashed down within a few years of being installed.

Because the manufacture, installation and inspection of the huge poles are unregulated, even when they are in publicly owned facilities, word of the failures has been slow to spread. Two of the accidents occurred outside of the state, in South Dakota and Massachusetts. The remainder have been in Texas.

No one has been injured. But school district officials say that's just luck. On March 6 , a 125-foot pole at the Hays school district's Bob Shelton Stadium toppled and slammed onto a high school gymnasium. At least 60 people were in the stadium at the time, waiting to watch a soccer game. The gym was empty.

There's no consensus among engineers on why the poles are falling. But structural analyses of several of the failures suggest that faulty design and poor construction may be at least partly to blame.

In each of the incidents, the poles share a common lineage: A Fort Worth broker, Whitco Co. LLP , purchased the huge tubes from a Mexican company called Grupo Polesa . Another company, Makers Co. Inc. of Fort Worth, turned the steel tubes into light poles according to Whitco's specifications, former Whitco company executives said. Sometime in 2005, Whitco began fabricating its own poles, they said.

Dennis Depenbusch , a Kansas-based investor who ran Whitco from 2000 through 2006 , said last week that he hadn't heard about the company's fallen poles and that he couldn't think of any reason products that Whitco sold during that period would suddenly start to fail.

Greg Haskin , president of the family-owned Makers, did not return detailed phone messages left with a secretary at his office. Executives for TransAmerican Power Products Inc. , the Houston-based branch of Grupo, also did not respond to attempts to contact them.

Whitco's name was on the bills of lading and the product warranties. At the time that it sold the now-failing poles, however, Whitco was undergoing a corporate upheaval. Started as a family-run business in 1969, Whitco was sold in 2000 to a group of out-of-state investors. But the new owners struggled with high debt and steel prices, Depenbusch said, and six years later, the company declared bankruptcy. (Another investment group purchased the Whitco name in 2006. Although the new company is also named Whitco and sells light poles, it is an unrelated entity.)

The company's dissolution means that school districts have been unable to pursue liability claims against it; many are out tens of thousands of dollars. Large poles alone cost about $8,000, and costs soar when lights are added.

After a 70-foot Whitco pole on the football field in the Midlothian school district crashed down in December, the district discovered cracks in three other poles. Officials said they spent $70,000 replacing the four poles and lights.

name.

The U.S. Consumer Product Safety Commission can investigate and recall products based on complaints submitted to the agency or news reports on a problem. Spokeswoman Kathleen Reilly said the commission has not had a complaint about Whitco.

As the news of falling light posts has filtered out to schools by word of mouth, more distressed poles have turned up. Last week, an inspection by football powerhouse Southlake Carroll, near Dallas, revealed cracks on the bases of three of four Whitco-sold poles at Dragon Stadium, district spokeswoman Lauren Becera said. Engineers were evaluating whether to remove them.

When it was in business, Whitco sold a couple of hundred large stadium lighting poles per year, said Tom Lach , the company's former structural engineer, who is now a Fort Worth-based lighting pole consultant. Eight fallen poles in just over two years represents a modest number of failures, he said.

Other engineers dispute that.

"These poles have a normal life span of 25 to 40 years," said Patrick Sullivan, who has been an Austin civil and structural engineer for 35 years and now specializes in forensic analysis of failed structures, including poles. "If they fall before that, that's not normal."

Although only eight poles have fallen, more have been removed because of safety concerns. When Sanger examined the remaining lighting poles at the district's athletic complex, Biggerstaff said, investigators found a 6- to 8-inch crack at the base of another pole next to the football field.

"There's no doubt that the third one was going to fall," said Chuck Galbreath , the district's athletic director. On April 3 , Sanger removed all 14 of the remaining athletic lighting poles as a precaution.

As a result of similar actions at other districts, at least 40 of the Whitco/Makers poles have been taken down over the past two years after inspectors found troubling cracks .

athletic lighting towers, which weigh up to 3 tons, are often purchased and owned by public entities. Yet while the poles are engineered to a variety of professional standards, there is no agency or organization ensuring that those standards are being met or upheld in the manufacturing process.

Those in the business say manufacturing athletic lighting poles is not complicated.

"It's simple metal fabrication," Lach said. Yet welding a tube as thin as a quarter-inch to a base plate as thick as 2 inches or more can be tricky.

Additionally, no single agency or organization takes responsibility for maintaining and inspecting the poles once they are installed. That is left to the individual owners, who, experts said, often don't follow the manufacturer's recommendations.

Lach recommends that owners inspect their poles at least once a year for cracks and loosened nuts at the base. But, he said, "most people who buy poles think, 'OK, I've bought it and installed it. Now, we can forget about it.' "

The Texas Department of Transportation owns thousands of 40- and 50-foot highway lights and more than 600 "high mast" lights that tower 150 to 175 feet above highway intersections, said Greg Jones, who oversees lighting in TxDOT's traffic engineering section.

But, Jones said, "there's really not anything we do with the poles. Most of our maintenance has to do with lights and mechanical things."

Jones said he knows of only two incidents of falling poles in recent years, both along highways in Fort Worth. Both poles fell into the highway median amid strong winds; neither was sold by Whitco, he said.

Like TxDOT, the Austin Energy electric utility — which has no Whitco poles — does not regularly inspect its high mast poles, a spokesman said. Crews look them over when six of the 12 lights atop the pole burn out — typically every three to five years. While there, crews give the poles a visual inspection.

But pole specialists say that is insufficient for detecting potentially significant flaws.

"With galvanized steel especially, you can't see the cracks," said Larry Peel of Fort Worth-based Steel Inspectors of Texas, who is often hired to investigate failed poles. Even with magnetic and ultrasound testing, he said, detecting flaws can be difficult.

Similarly, school districts contacted by the Statesman said they did not regularly inspect the giant poles around their athletic complexes. After the publicity of the Hays stadium pole failure, several districts said they would begin regular checks.

Engineers cite different reasons that Whitco poles have fallen, and former company officials said there may be no common link.

"It could be 100 different things," said Lach, including a terrible coincidence, a bad batch of steel, a poor weld, too many lights on the poles or weather.

Two of the three in-depth forensic investigations that were done after accidents, however, cite design or workmanship flaws in the poles. None has found fault with the installations, which are contracted out by school districts.

In several cases in which a pole purchased from Whitco has fallen, according to interviews and news reports, the school districts said they suspected that weather was responsible. Yet a review of weather records for the dates on which the accidents occurred found that although in some instances winds were considered high — up to 40 mph in

one case — speeds and gusts fell far short of the poles' stress specifications.

But Sullivan said that under the right circumstances, even very light winds can topple huge poles. In a phenomenon called "hammer vibration" that is still not completely understood by engineers, winds of 15 mph or even lower can cause a pole to vibrate extremely rapidly — like a tuning fork. Over time, the vibration can cause cracks at the base. Because the conditions under which the vibration occur are nearly impossible to predict, Lach said manufacturers' warranties usually do not cover damage caused by hammer vibration.

"Fatigue cracking \u2026 caused by wind-induced vibrations" was responsible for toppling a 130-foot pole at the Round Rock school district's athletic complex late last year, according to a January engineering report by Wiss, Janney, Elstner Associates Inc., an Austin engineering firm. The stadium light pole at the complex on West Parmer Lane crashed into the parking lot overnight Dec. 13. Purchased from Whitco, it had been installed five years earlier.

Several days later, Round Rock district officials removed the remaining three poles at the stadium after engineers found "numerous" cracks about 2 inches in length, according to the report.

When Sullivan analyzed the Hays incident, he concluded that wind-related vibration caused the pole's metal to fatigue and ultimately break, according to his March 12 report. But he also observed that the Hays pole was too narrow for its height and the weight of the lights. The quarter-inch thickness of the metal at the base of the tube was "far less than the minimum thicknesses now recommended in the literature," he wrote in his report.

Newer poles greater than 100 feet in height are designed with a thickness of five-sixteenths of an inch, Sullivan said. For a 125-foot pole such as the one in Hays, he said, "a half-inch is more appropriate."

Sullivan also said the pole's 15\/8-inch base plate was too thin. Base plates on newer poles of its size, he said, are 21\/4 inches thick .

At one time, Whitco's base plates were thicker, said James "Kip" Pritchard, who owned his family's company, then named Whitco Sales Inc., before selling it to Depenbusch and others in 2000. He said he continued to work under the company's new ownership through January 2004. Around the time that several of the failed poles were made, he said, Whitco's new owners reduced the thickness of its large athletic pole base plates.

"That sized poled with that sized base plate is not how we used to do it," he remembered thinking. "I'm not a structural engineer. But it left me scratching my head."

Sullivan also questioned the quality of the welds that were holding the bottom of the Hays pole to the base plate.

"I'd call the welding ugly," he said. "It was 'notchy'-looking," a pattern he said could lead to metal failure around it. "Somebody wasn't minding this particularly well."

Poor welding was responsible for the falling of another Whitco pole, a forensic study found . According to Pritchard and Depenbusch, Makers Co. assembled and welded poles to the base plates.

When a 90-foot pole alongside an athletic field at Worcester Technical High School in Massachusetts pitched over on a gusty afternoon in February 2007, it had been up for only a year. A visual inspection found another pole on the verge of falling; officials used a bulldozer to tip it over. Eventually, all 11 poles at the field were removed.

A follow-up investigation using magnetic particle testing revealed hidden cracks in all of them, said Paul Moosey, an assistant commissioner at the Worcester Department of Public Works.

"They were all cracking, from the manufacturing," he said.

Because the poles were fabricated around the time when Lach says Whitco began doing the work itself, it's unclear who performed the weld.

The engineering investigation concluded that poor welding of the giant pole to the base plate was to blame.

"They were overwelded," Moosey said. Because of that, he said, the metal weakened and then cracked at the base.

Troubles with light poles

Eight light poles sold by Whitco Co. have fallen since 2007 and 36 others have been removed, according to records obtained through the Texas Public Information Act. Here are sites where poles have fallen or cracking has occurred :

Outside of state

-In October , two poles purchased in 2005 fell at an athletic field at Northern State University in Aberdeen, S.D. University officials determined that a structural failure was to blame, and two other poles were removed.

-In 2007, a 1-year-old pole fell at a field at Worcester Technical High School in Massachusetts. Eleven other poles were removed after hidden cracks were found in all of them.

Texas

-Sanger: One pole fell April 1 and another April 2 in the Sanger school district. Both were installed in 2002. The district removed 14 other light poles as a precaution after a crack was found on a third pole.

-Buda: On March 6 , a light pole fell onto a Hays High School gymnasium in the Hays school district before a soccer game. Three other poles were taken down the next day after cracks were discovered. The poles were purchased in 2002 .

-Round Rock: A light pole at the district athletic complex fell Dec. 13. Officials removed three other poles after discovering additional cracks. All were purchased in 2003.

-Midlothian: A pole fell in that district Dec. 3. Engineers found hairline cracks on three other poles, which were then removed. Six smaller poles with a different design that also were purchased from Whitco in 2001 remain on the district's baseball field. Ultrasonic tests on those poles revealed no cracks; the district has inspected them visually each week since December.

-Southlake: The Carroll school district found cracks on three of four poles at its football stadium. The district is waiting to hear from engineers on whether the poles, purchased in 2001, can be fixed. In the meantime, the stadium has been barricaded and closed.

Source: Staff reports

edexheimer@statesman.com; 445-1774

alorenz@statesman.com;

512-392-8750