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Land at Yeager Airport slide site was shifting for nearly 2 years

By David Gutman



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Concrete blocks that crown the man-made hillside at Yeager Airport started showing cracks in the summer of 2013. By 2014, the surface had shifted by several feet. It collapsed into a massive

landslide earlier this month.

The safety-overrun area at Charleston's Yeager Airport, which partially collapsed in a landslide earlier this month, had shifted by several feet more than a year ago, according to an engineering survey provided to the airport.

Airport employees first noticed a problem with the safety area on Runway 5 in either June or July 2013. Twenty months later, that seemingly small problem — cracks in the pavement — would turn into a full-blown catastrophe as the man-made ground beneath the overrun area fell away, ultimately destroying a church and at least one house and forcing 116 people to evacuate their homes.

After the airport noticed the cracks in 2013, officials contacted Triad Engineering, the firm that designed the runway expansion project, according to accounts provided by Yeager and Triad. S&S Engineering, another firm involved with the construction project, also surveyed the area.

The cracks were in the Engineered Materials Arresting System, a bed of specially engineered concrete blocks designed to break down if an airplane overruns the runway, much like a runaway-truck ramp. The area was credited with saving 34 people in 2010, when it stopped a US Air regional jet that had overrun the end of the runway during an aborted takeoff.

Yeager and Triad said the cracks were first noticed in July 2013; S&S said it was in June of that year.

“In June of 2013 Yeager Airport personnel noticed large cracks developing in the asphalt pavement and the EMAS block joints,” S&S wrote in a February 2014 report that it filed with Yeager. “The joint tape used to seal the blocks was tearing and separating allowing rainfall to enter block joints. Airport personnel became concerned that the cracks in the asphalt extend under the EMAS blocks allowing the rainwater to enter the engineered fill material.”

The day after the March 12 landslide, Triad had described those cracks as “minor.”

In 2013, Triad surveyed the area, measuring and assessing the cracks and comparing its findings with a survey that had been done in 2009, after paving of the safety-overrun area was completed.

“On the basis of that analysis, Triad recommended additional monitoring,” Yeager spokesman Brian Belcher wrote.

S&S did two surveys of the EMAS, one in October 2013 and one in February 2014.

In the four months between those surveys, S&S found that the EMAS moved about one inch forward, one inch to the left and two inches downward.

However, the February 2014 S&S survey, when compared to the 2009 survey that Triad did when paving was finished, showed much more movement.

“The southwest corner of EMAS has moved forward 1.3 feet along the projected centerline, 2.7 feet to the left and 3 feet downward,” S&S wrote.

In July 2014, a year after the cracks first appeared, Triad installed 28 monitoring points along the surface and sides of the embankment.

Every one of those points showed movement between July and August 2014, although none greater than two inches.

Construction of the EMAS began in 2005 and, along with the airport’s other runway expansion projects, was plagued with smaller slides and environmental problems.

The man-made slope, built by the Pennsylvania firm Cast & Baker, was finished in 2007, but side projects related to the runway expansion continued for years afterward. Reached Friday, Cast & Baker would not comment.

In 2008, the airport agreed to pay the West Virginia Department of Environmental Protection a \$37,000 fine for multiple water pollution violations associated with its runway expansion projects.

The slides and runoff problems continued after the airport had settled with the DEP.

In 2009, the airport began modifications at four sites on its property, to help better manage stormwater runoff. All four sites were in the watershed of Elk Two-Mile Creek, the stream that briefly flooded last week after the landslide blocked it.

“Yeager Airport has identified several areas along Eagle Mountain Road, Airport Road and Keystone Drive that are experiencing severe erosion during heavy rainfall,” S&S wrote to the DEP in 2009.

In 2011, with the projects finished, Yeager officially terminated its water pollution permit for the construction.

“Site is stable,” the DEP wrote at the time, meaning that at least 70 percent of the disturbed land had been re-seeded with grass growing on it. “Therefore [the permit] is recommended to be terminated.”

The cracks found in 2013 were discussed at several airport board meetings in the summer and fall of that year, but they do not appear to have been otherwise announced publicly.

“EMAS manufacturer will be here in mid September to evaluate the EMAS bed, random slabs will be chosen and tested,” read the minutes of the August 2013 board meeting. “The EMAS bed has been in place for seven years and the life expectancy is 10 to 20 years.”

The EMAS manufacturer inspected the bed and the blocks on Sept. 18, 2013, according to board meeting minutes.

“The preliminary results of the EMAS inspection indicate that the EMAS material is functioning in the

manner expected,” the minutes of the October 2013 meeting read. “Most likely it will be recommended to install the next generation of tops to the EMAS to prolong the life expectancy of the system by preventing water infiltration.”

Edison Hill, the chairman of Yeager’s board, said at the time that there was no indication of an underlying problem.

“There has not been a concern on behalf of the board that anything like this could occur,” Hill said.

Hill said residents below the airport were not notified of the EMAS movement because “there was no feeling of alarm back then. I’m sure we deferred to the engineers.”

As recently as March 11, when Yeager Director Rick Atkinson called an emergency board meeting, an engineer told the board that the chances of a catastrophic failure were “very, very slight,” Hill said.

The next day, the hillside tumbled down onto Keystone Drive.

The 270-foot-tall embankment is the highest man-made slope of its kind in the world. At 45 degrees, the hillside is 50 percent steeper than it was before the fill was added to create the safety-overrun area.

In early March, Triad hired Rick Valentine, an outside expert in geo-reinforced slopes, to help monitor the slope.

On March 8, four days before the landslide, Triad began a “subsurface” investigation, to evaluate the fill movement, the firm and the airport said.

“On March 10, settlement of the southernmost corner of the fill became more pronounced and Triad immediately notified Yeager officials,” wrote George Manahan, a public relations professional hired last week by Triad.

The next day, Atkinson called the emergency board meeting and the area of Keystone Drive directly below the fill was evacuated.

The day after that, Thursday, March 12, brought the full landslide, fears of flooding and the evacuation of much of Keystone Drive, Barlow Drive and Mays Lane. Or, as Belcher described it in a timeline of events, March 12 brought “Failure of the mechanically stabilized earth retention structure.”

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