

Chandler Heights Fissure Swallows Horse

By Mimi Diaz, Arizona Geological Survey

An earth fissure in Chandler Heights re-opened Saturday night (July 21, 2007) during a thunderstorm that dropped two inches of rain in an hour, and effectively swallowed a horse, in addition to damaging corral fences and San Tan Boulevard, and shutting down Happy Road at 195th Street (Figure 1).



Figure 1. Fissure that re-opened across Happy Rd at 195th St in Chandler Heights during a storm on Saturday, July 21, 2007. (Photo by M. Diaz, AZGS.)

This fissure, known as the “Y-crack” for its shape, extends from just north of the San Tan Mountains and crosses the Hunt Highway and San Tan Boulevard before curving westward and stopping short of Sossaman Road (Figure 2), and is visible on aerial photographs as far back as 1969. As the Chandler Heights area developed, the fissure was backfilled in places.

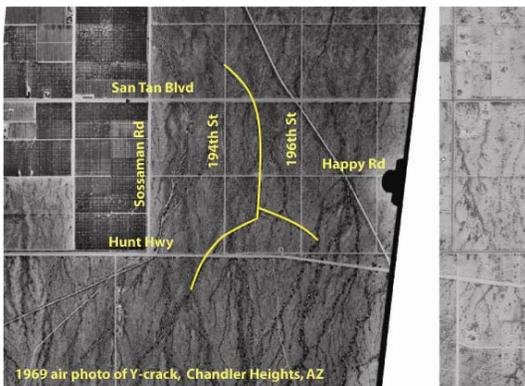


Figure 2. The north-south trending portion of the Y-crack runs immediately west of where 195th Street would be in this aerial photograph from 1969. (Photo courtesy Flood Control District of Maricopa County.)

During Saturday’s rain event, water flowing through the Y-crack undermined the backfill, creating a large void, and surface runoff caused the crack to widen. When the backfill finally collapsed, it left a gaping hole that was more than forty feet deep in places, and fifteen feet wide in others. Yellow tape and barricades extend across the intersection of 195th Street and Happy Road, and warning barricades are on either side of San Tan, east of Sossamon, with four metal plates spanning the fissure where it crosses the road (Figure 3).



Figure 3. Surface crack exhibited where San Tan Blvd crosses the Y-crack, west of 195th St. Barely visible in the top part of the photograph is one of the metal plates straddling the fissure since the storm. (Photo by B. MacFarlane, AZGS.)

Subsequent to a storm in August 2005, when it re-opened and damaged fences and roads, it was backfilled yet again. This event was the catalyst that drove the legislation (passed in September 2006) mandating that fissures be disclosed in real estate transactions, and requiring the Survey to map all the fissures in Arizona within five years, and to make those maps public through the Arizona State Lands Department.

People frequently backfill fissures as a mitigation effort; however, backfilling is ineffective. Fissures form at the groundwater table and work their way upward. Water flows through the fissures

in the subsurface, undermining the fill, and allowing for catastrophic collapse (Figure 4). This process is enhanced by runoff from precipitation, which serves to widen the surface expression of the fissure.



Figure 4. Portion of the y-crack north of San Tan Blvd that had been filled and lined with river rock. The fill was undermined and the rock collapsed into the fissure after Saturday's event. (Photo by M. Diaz, AZGS.)

In addition to trenches that open unexpectedly (posing hazards to motorists and whatever happens to be on top of the fissure), other hazards associated with fissures include changes in drainage patterns that cause areas to flood that previously didn't, breaking water, sewage, and other lines that cross the fissures, and groundwater contamination (Figure 5).

Unfortunately, many people view these linear cracks in the ground as the ideal dumping spot for unwanted materials, like pharmaceuticals, refrigerators, tires (Figure 6), manure, garbage, etc.; however, nothing could be further from the truth. Fissures provide a direct conduit for the contaminants to flow into the groundwater, so anything dumped into

a fissure will pollute the water directly instead of being filtered through many layers of sediment.



Figure 5. Vehicle that unexpectedly encountered the newly re-opened Y-crack at Happy Rd and 195th St after the August 2005 event. (Photo by K. Fiebelkorn.)

The two questions most frequently being asked are, "How do I know if there is a fissure on my property?" and, "What can be done to mitigate the effects of fissures?"

In order to answer the first question, check out the Earth Fissure Planning Maps, available online at our website, or for \$4 each at the at each of the AZGS branch offices in Phoenix and Tucson. The planning maps identify areas where we will be doing detailed fissure mapping, and can give you an idea of whether there are fissures in the vicinity. If you suspect that there are fissures in the neighborhood, you may want to contact a qualified geologic or geotechnical consultant to identify the presence of fissures, and any remedial measures that may be taken.

The most effective fissure mitigation strategy is to avoid the fissures altogether—keep buildings and infrastructure well away from them, and use caution when traversing those areas. Keeping excess runoff and drainage away from the fissure will also help minimize widening. And, avoid putting things in fissures that you would rather not drink (Figure 6).



Figure 6. Fissures open directly to the groundwater table; objects placed in fissures can directly contaminate the groundwater. This fissure is southwest of Baseline and Ironwood in the East Mesa/Apache Junction area. (Photo by T. Shipman, AZGS.)

Cash's untimely death is a reminder that fissures pose hazards not only to inanimate objects like buildings and infrastructure, but to life safety as well. Making the effort to learn where the fissures are, and then planning accordingly may do more than help you avoid costly damage to your home—it may just save your life.

Sadly, the re-opening of the Y-crack ended in tragedy when a 13-year old, 1100 pound horse, Cash, fell into the fissure as the backfill collapsed underneath him (Figure 7). Despite the 15 hours of valiant rescue attempts by his owners and rescue crews, Cash died before they were able to extract him from the fissure.



Figure 7. Portion of the Y-crack that collapsed underneath a horse during Saturday's thunderstorm. The fissure here is roughly 10 feet wide and 12-15 feet deep. (Photo by B. MacFarlane, AZGS.)