



# SPAN

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## Is Fairy Bridge the Longest Span on Earth?

An excellent article in the Utah Geological Survey publication *Survey Notes* in May 2009 credited NABS with finally settling the question of what is the world's longest natural arch (go to [tinyurl .com/surveynotes](http://tinyurl.com/surveynotes) for a 3.7 MB PDF copy). The article accurately described the issues that are involved in defining and measuring the sizes of natural arches, and pointed out that in October 2006, Jay Wilbur of NABS led a team that obtained a precision measurement of Kolob Arch and found its span to be some three feet less than that of Landscape Arch (see "Kolob Arch Measured," SPAN, Jan. 2007). The article did refer, however, to a "cloud of uncertainty" that still hung over the results "because of stories of a great arch in China that could eclipse them all."

The story about Landscape Arch being the longest in the world was picked up by the Associated Press and carried in a number of newspapers around the country. Although this was very nice publicity for NABS, it is a twist of irony that just as the story came out we were revising the list of giant arches on the NABS website to include not one but four natural arches in China with spans over 200 feet. One of these, Fairy Bridge, may even have a span greater than Landscape Arch.

Before providing details about these four arches, it is of interest how the information was obtained. Were we contacted by a Chi-

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Figure 1. Fairy Bridge (Xian Ren Qiao), NABSQNO 48R-682110-2731570. Photo from Panoramio by ivanytng





Figure 2. Gaotun Natural Bridge (Tiansheng Qiao), NABSQNO 49R-317525-2913540.

Photo from Panoramio by sanwany

**1. Fairy Bridge** (Xian Ren Qiao, NABSQNO 48R-682110-2731570, Figure 1) is a meander natural bridge carved through limestone karst by the Buliu River, a tributary of the Hongshui River. It is located about 90 km northeast of Bose in northwestern Guangxi Province, China. Raft tours of the Buliu River that float under this bridge are a popular tourist attraction and the only practical way to visit the bridge. Fairy Bridge has a span of  $295 \pm 20$  feet, which is very close to the 290-foot span of Landscape Arch. Thus, Fairy Bridge could be the world's longest natural span but its true ranking cannot be confirmed until a more accurate measurement is made. The estimated height of the opening is 210 feet. A Guangxi Travel Guide website claims a span of 177 meters (580 feet). We are not sure how that number was obtained.

nese geography professor who gave us the information? No such luck. If there is anybody in China who has collected information about natural arches there, we certainly don't know about it. The information was instead obtained by an entirely new method – arch hunting by computer!

The primary tools for this are Google Earth and Panoramio (see article “An Introduction to the Power of GIS” in this issue for more information). Many modern digital cameras are equipped with GPS devices that stamp the photo with coordinate information. Such photos posted to the Panoramio website are linked with Google Earth, making it possible to zoom in on the satellite images in Google Earth and find Panoramio photos of what is there on the ground (although the locations are usually a bit off). Some of these photos are of natural arches. Sometimes the resolution of Google Earth is sufficient that a large arch can even be seen directly. If Panoramio or another source provides a name for the arch, a web search can be done that might turn up a travel blog or other tidbits of information about the arch. Gradually, the pieces start coming together.

Especially useful are any additional photos, since photos from different perspectives provide helpful information for size determination (helpful also is the fact that many of the Panoramio photos are very high resolution). All of the size data on these Chinese arches were obtained by photoanalysis done by Jay Wilbur, utilizing items in the photos that are of known size. Although this is obviously not as accurate as direct measurement in the field, the degree of error can be calculated and the results can be quite reliable. Jay has honed his skill in the art and science of photoanalysis for many years, practicing on arches with known dimensions. His size data are not published until a high degree of confidence is obtained.

Using these techniques, Jay is gradually cataloging Chinese arches on the NABS website at [www.naturalarches.org/china](http://www.naturalarches.org/china). Thus far the project has turned up four “giant” arches that belong on our list, provided below, of arches over 200 feet. One of these four may actually be the longest in the world.



Figure 3. Tushuk Tash (Shipton's Arch), NABSQNO 43S-545210-4388680.

Photo by Ray Millar





Figure 4. Jiangzhou Arch, NABSQNO 48R-700115-2690930.  
 Photo by Graham Salmon, courtesy Cave and Karst Science, Vol. 34, No. 2, 2007

**2. Gaotun Natural Bridge** (Tiansheng Qiao, NABSQNO 49R-317525-2913540, Figure 2) is a waterfall natural bridge eroded through limestone karst by the Bazhou River, a tributary of the Fulu River. It is one of the major attractions of the Bazhou He Scenic Area, an area developed for tourism. It is located near the town of Gaotun in Liping County, Miao and Dong Nationality Autonomous Area, in Guizhou Province, China. Access is via walkways and trails that run through and over the bridge. The span (according to the NABS definition) is  $230 \pm 20$  feet.

A sign by the bridge gives a span of 138 meters (450 feet) and states “it has been written down in the Guinness record.” We have so far not been able to confirm a Guinness record listing (*Guinness World Records 2009* has no listing for natural arches and *Guinness World Records 2008* lists Rainbow Bridge as the largest natural bridge). The large difference in claimed spans is not due to any inaccuracies in measurement but rather to different definitions of “span.” Gaotun Natural Bridge is a tunnel-like opening where one entrance is much wider than the other. The NABS definition of “span,” which has the advantage of being mathematically precise and being applicable to arches of any geometry, requires measuring the smallest aperture (shown in the photo).

**3. Tushuk Tash** (Shipton’s Arch, NABSQNO 43S-545210-4388680, Figure 3) is composed of a crumbly conglomerate and is located northwest of Kashgar in Xinjiang Autonomous Region, China. The arch was first reported in the west by British mountaineer Eric Shipton in his 1947 book *Mountains of Tartary*. He estimated the height at 1000 feet and the span at 150 feet. A National Geo-

graphic team visited the arch in 2000 and measured the height at 1200 feet but did not measure the span. Detailed photoanalysis in 2009 yielded a span of  $212 \pm 10$  feet but confirmation in the field is still needed. It is very likely the highest natural arch in the world and at one point was reported as such by Guinness.

**4. Jiangzhou Arch** (NABSQNO 48R-700115-2690930, Figure 4), which forms a gateway to the village of the same name, is a meander natural bridge eroded through Devonian limestone karst. It is located about two km east of the village of Jiangzhou in Guangxi Province, China, about 60 km northeast of the city of Bose. It has a span of  $212 \pm 15$  feet and a height of about 100 feet.

The table below contains a current list of all the natural arches in the world we know about that have spans greater than 200 feet. This list has a long tradition and has undergone many changes. In his 1986 book *Utah Canyon Country*, Fran Barnes provided a list of nine arches that

were 200 feet or more. The list was confined to the Colorado Plateau, but no arches of that size outside the Colorado Plateau were then known. Barnes correctly pointed out that determining what is the “biggest” arch depends on how “size” is defined and how measurements are taken. Today we have the advantage of having a precise definition of “span” that applies to an arch of any geometry (see “On Measuring Arches,” SPAN, July, 2005).

When the NABS website was created in 1995, one of the very first set of web pages consisted of a list of the “Big 9.” This web section was created by Jens Horstmann, and I wrote the text. One arch from Barnes’ list (Owachomo) was dropped, and another arch (Snake Bridge) was added. Since then the

ranking has been revised 10 times as new data was obtained. Two more from Barnes’ list were dropped in 2007: Kachina Natural Bridge was measured by Jay Wilbur and Craig Shelley using precision laser range-finding at 192 feet  $\pm$  1 foot, and Craig Shelley took a measurement at Wrath Arch which proved that the span does not exceed 180 feet.

The first arch from outside the United States, Aloba Arch, was added to the list in 2004,

thanks to a measurement taken by NABS member Gunter Welz. In 2006, Outlaw Arch was discovered in Colorado and also added to the list. The biggest change to the list was made in May, 2009, when the original “Big 9” was expanded to the “Big 13” by adding the four arches from China. Further changes are anticipated in the future, especially because we currently have less accurate measurements for the arches that are outside the United States. If anyone has suggestions for where NABS could acquire a grant to perform such measurements, please let us know.

### Natural Arches With Spans Greater Than 200 Feet

Rank	Name	Location	Span
1.(?)	Fairy Bridge	Buliu River, Guangxi, China	~295 ft
2.	Landscape Arch	Arches National Park, Utah	290 ft
3.	Kolob Arch	Zion National Park, Utah	287 ft
4.	Aloba Arch	Ennedi Range, Chad (Sahara Desert)	~250 ft
5.	Morning Glory Natural Bridge	Moab, Utah	243 ft
6.	Rainbow Bridge	Rainbow Bridge National Monument, Utah	234 ft
7.	Gaotun Natural Bridge	Bazhou He Scenic Area, Guizhou, China	~230 ft
8.	Sipapu Natural Bridge	Natural Bridges National Monument, Utah	225 ft
9.	Stevens Arch	Escalante River, Utah	220 ft
10-11.	Shiptons Arch (Tushuk Tash)	Near Kashgar, Xinjiang, China	~212 ft
10-11.	Jiangzhou Arch	Jiangzhou, Guangxi, China	~212 ft
12.	Outlaw Arch	Dinosaur National Monument, Colorado	206 ft
13.	Snake Bridge	Sanostee, New Mexico	204 ft