B4 Paleo Cave-Sediment Preservation Project

By Joe Sydney of HCG, and Dirk Stoffels of CSS

Attendance
HCG
CSS
HSC
UTSSS
CASM
SUSS

27-28-29 May 2011

Bungonia Gorge with quarry-Joe Sydney/HCG

B4 Paleo Cave-Sediment Preservation Project Finished! Bungonia National Park NSW

Bungonia National Park has one of most significant karst regions in NSW. With over 300 known caves and deepest mainland cave, it is regarded as one of the sporting mecca's in Australia. Not only do cavers regularly visit, but it is also visited by families and adventurous outdoor sports people. Bungonia offers more than just caving with activities such as canyoning, bushwalking, bird watching and more.

But with all this activity, there is a price to pay. In the early 90's when Julie Bauer, author of the book Under Bungonia, was researching the park's geology as part of her university studies, she recognised that some cave sediments were worth future research. It was some years later that the Highland Caving Group (HCG) began noting the degradation of cave sediment by recreationalists in the Kings Cross area of B4 Fossil Cave. When recreationalists were crossing the Kings' Cross void and climbed up the embankment, cave sediment was being kicked away from the wall and floor. Some HCG members who also use the cave noted that the sediment was being eroded at an alarming rate so informed the parks advisory group, B.R.A.G.

In discussion with BRAG they asked for caver advice on what would be the best way of preserving the cave sediment. HCG needed to consult with the New South Wales Speleological Council clubs for further advice with the Canberra Speleological Society (CSS)

B4 Fossil caveave/Kings Cross void showing sediment and worn pathway.

showing interest and offering advice. The discussion between HCG and CSS brought up many ideas with the most suitable being some type of bridge. The idea was floated with parks and they too consulted their internal experts. Soon after it was agreed that some type of bridge would be the most appropriate for this location.

Bridge design

During 2008, CSS took on the challenge of designing a bridge and came up with an initial design. The draft plan was submitted to parks who in term gave it to their engineers.

The engineers accepted the design with few changes. The design is based on a number of horizontal laminations being bolted together, and a vertical ladder. Not only would this aid in keeping cavers to a path, but would also assist those with limited climbing skills needing to cross a wide void.

With plans approved it was time to think about how to implement the concept. CSS decided that a pre-construction mock bridge would aid in seeing where the bridge fitted, but also if the long lamination sections could be taken into the cave. Sections of 50mm PVC pipe with joints were ordered and a date of Feb 2008 set aside to build the mock bridge. ASF clubs were contacted for 'experienced' caver assistance with 12 cavers turning up.

PVC joints used to make mock bridge.

New HCG member Fiona Ray marks PVC pipe for cutting.

The pipes, joints and tools were taken into the cave with key people given tasks to do and it wasn't long before the first side lamination/pipe were constructed. The bridge started to take form and we could see where the two bridge base plates needed to be installed. After a couple of hours, the PVC pipe bridge was complete. Most of the bridge was then dismantled except for one 5 metre side section so that we could see if we could get it through the cave. If you know B4 Fossil Cave there are some tricky sections in the cave that required some negotiations but with lots of cavers spaced throughout the tight sections, the process was quite easy.

With the PVC side lamination mock up now sitting in Dirk Stoffels (CSS) garage, it was time to work on final specifications and metal requirements which took some time. Consulting with Parks and their engineers, the most suitable material was selected based on carting of the lamination sections into the cave, cave environment, cost, and ease of fabrication.

Mock PVC bridge with ladder.

In the end, mild steel was selected with Parks experts agreeing. During early 2010 Parks with approval from the Karst Geodiversity Unit, Parks approved the funding of $3300.00 to purchase the steel required by CSS to fabricate the bridge. In late 2010 with funding now available the steel was purchased and fabrication of two base plates and one side lamination could commence

In February 2011 the two base plates and single side lamination were fabricated and ready for a test fitting. Clubs were contacted again for experienced cavers for a trial installation date of Saturday 19 February 2011. Thirteen cavers were selected based on their experience in various fields such as cave rigging, SRT etc. Three pitches were rigged for lowering and raising if needed and the 4.5metre long

bridge component was wrapped to ensure cave protection.

With so many cavers present throughout the cave it was easy to pass the lamination from cavers to caver. The trickiest section was at the southern end of The Canyon where we noted that a couple of well placed bolts to aid lowering would not go astray. Later on the bolt placement was discussed by BRAG and in the interest of caving safety; it was thought that the bolts could also aid a rescue from the popular cave if needed so they were placed.

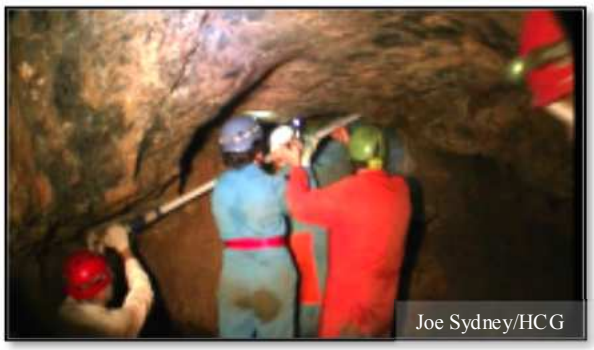
Cavers setting up rigging at B4 entrance.

Cavers lowering lamination section into B4 entrance.

At the Kings Cross void the two base plates were fitted with lamination and we could see what rock required re-engineering. With a bit of tweaking it looked as though the bridge had sufficient room and fitted nicely so we exited the cave taking all bridge parts with us. Knowing that the bridge would fit with little trouble eased our minds so it was not into the next stage, fabricating the entire bridge.

Fabrication of the bridge and ladder was finished in April as it took some months to cut and weld 11 mild steel laminations for the bridge, and fabricate a ladder. However with the coming of the ASF Conference at Chillagoe in Queensland meant that key players and cavers will not be available for installation of the bridge. On return from the Conference HCG immediately sent an email to clubs calling for assistance with installation on May 27, 28th and 29th. Twenty four cavers turned up on the weekend!

Lowering the lamination through B4 entrance pitch.



Maneuvering the lamination up into the Letterbox Squeeze.

Luke Gannon/HCG measuring the level.

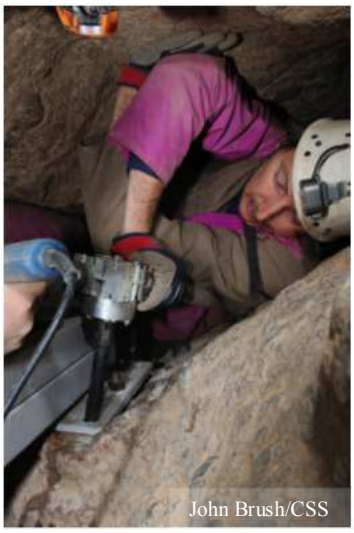
Blackish Blind Snake found at 2nd pitch.

Fabricated bridge siting in Dirk's garage.

A few cavers took the Friday 27th off and assisted with the pre-rigging of the cave, installing the electrical lead for power tools, setting up the generator in a suitable location, and, setting up a Michie phone communication line. A UHF radio mast was also set up to communicate with cavers throughout the Parks, and, Ranger station. Installation of all this took half a day so here was sufficient time left over for all the bridge laminations to be lowered into the entrance chamber.

Cavers carrying a bridge section through B4 Fossil cave.

Cavers leveling the bridge frame.



Caver drilling the anchor holes.

With all cavers meeting at the B4 car park they were briefed for safety, their tasks and with a tool box discussion. That way everyone knew of the overall plan and where things were. By the time everyone was organized the first cavers started to enter the cave around 9am. It didn't take long before the bridge components and tools arrived at the work scene and work commenced. First was the leveling for base plates and then fitting of the side lamination. Once fitted, the M20 x 200mm deep base plate bolt holes were drilled with bolts temporarily placed. When all the laminations were in place, the side bolts pulling the bridge together were placed and this now meant that the bridge is one solid piece of metal.

With the bridge constructed by 6pm it was time for cavers to exit the cave for a hot meal. As many caving clubs were involved, an application was submitted and granted by the Australian Speleological Federation Karst Conservation Fund for equipment/bridge component transport petrol cost, and, hot meal for cavers! HCG members cooked up a fine meal ready for exiting cavers with minestrone soup, marinated chicken and steak with hot potatoes and pasta salad followed by apple crumble with custard! The cavers were very appreciative that after a hard day's work and feeling exhausted, that hot food was ready for them on exiting a cave.

Later that night after dinner, a few key cavers had to return into the cave to glue in the bolts. By doing this it meant that in the morning, the glue would be set and the bridge ready for its final stage of construction, the ladder.

Cavers rose early on Sunday morning in anticipation of getting the job done and returning home early.

The ladder did not take long to install and in the meantime, cavers started to take out what gear was not needed. By 12 noon the ladder was installed and cave totally de-rigged!

Vertical ladder section protecting cave sediment.

Bridge and ladder installed over B4 Kings Cross void.

The weekend of installation was a total success which is a testament to the experience and the hard working nature of all cavers involved.

It is estimated that the cost of caver time for this project between 1992 and May 2011, is around $47,300.00.

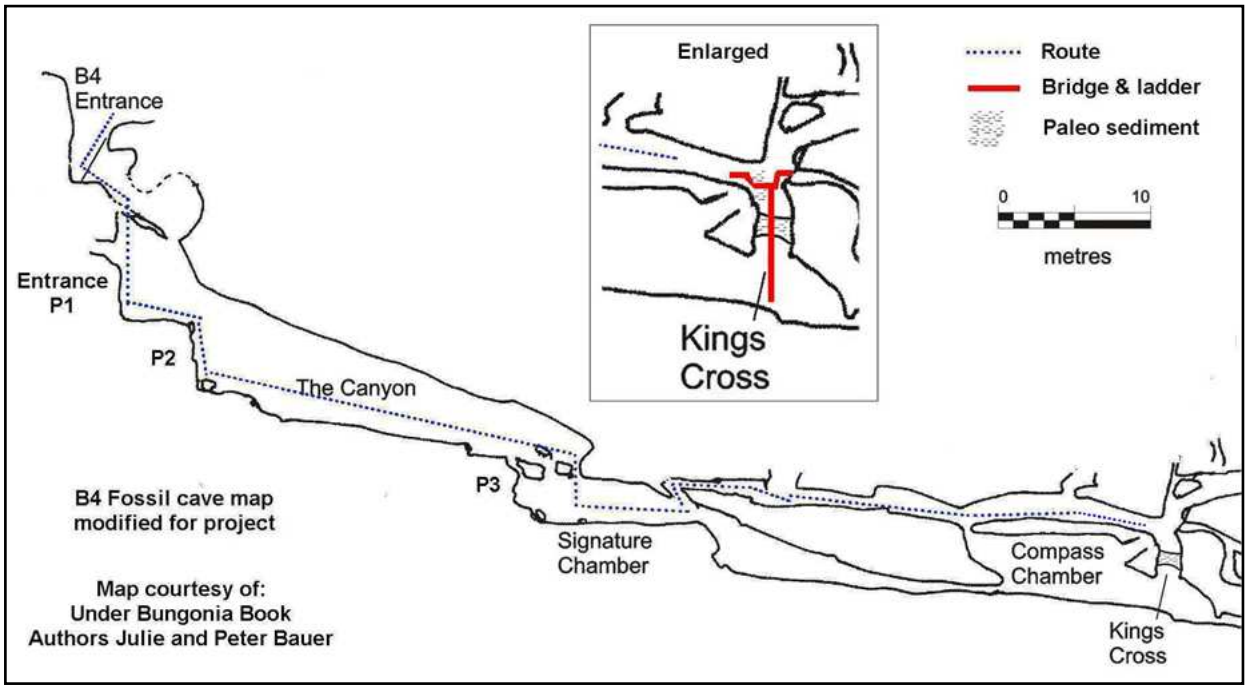
The Highland Caving Group and Canberra Speleological Society would like to thank Bungonia National Park and Bungonia Recreation Advisory Group (BRAG) in allowing them to undertake this project.

We also thank the Australian Speleological Federation Karst Conservation Fund in granting a small allowance to recoup equipment transportation fuel costs and feed the hungry masses.

A final thank you must go to all the hard working cavers from the following clubs:

CASM, CSS, HSC, HCG, SUSS and UTSS.

Photo showing slot where cavers climbed and damaged paleo cave sediment on wall. The bridge encourages cavers to by-pass this section.



Map of B4 Fossil cave showing the location of paleo-sediment with proposed laminated bridge.