



Bam's old city before the earthquake: a veritable encyclopaedia of ancient Middle Eastern building methods: domes, vaults, squinches, fortifications made with sun-dried brick in

techniques that date back to Biblical times. The old city was largely deserted since the 1930s and so had already partly fallen into decay. Restoration work had started.

## View from Bam

One of the finest and most ancient mud cities in the world, Bam, in Iran's Kerman Province, was largely demolished by an earthquake in December. Archie Walls reports on past glories and possible futures.

I waited 30 years to visit Bam. When I did, it was a dream come true – and that was in December. As the reports came through, I was overwhelmed by a feeling of loss, not only for a magnificent city but for the engaging children I had met, and friends we had made whose hospitality abounded – plump Bam dates, full of flavour, sticky syrupy cakes, sweet black tea – and in the nearby town of Mahan a mouth-watering lunch

of local specialities spread on a floor strewn with rugs, a blazing fire in the hearth and spectacular views out to the Shah Nematollah Vali mausoleum. Life flowed so naturally that it is difficult to conceive of the horrors, the loss and bitter cold the survivors have endured since.

What was so special about Bam? It is in the first rank of my Great Magical Cities of the Orient: cities such as the walled Old City of Jerusalem with the holy sites of three religions; Aleppo, with its central citadel and miles of covered markets; Damascus with its Grand Mosque; Cairo with its many Islamic monuments and the millions of people living in its narrow byways; and Sana'a with gravity-defying earthen structures and beautiful gardens. Bam had many of the characteristics common to these cities and, although smaller than most, its

uninhabited ruins offered an abandoned, mystical quality in the midst of a desert with sharp mountains on the horizon – a perfect setting for *The Rubáiyát of Omar Khayyám*.

Bam is located on top of a large archaeological mound. This, together with the architecture of its buildings, illustrates how it has developed and changed over its 2000 year old history. Far below the existing fortified circuit of walls, there is another line of mud brick walls and watchtowers that separate the city from the wide flood plain of the Poshtrud River. These walls indicate an even greater area that was once inhabited and defended. Bam provided a veritable encyclopaedia of such historic structural elements: varieties of sun-dried mud brick squinches and vaults, many with the inclined arched technique recently used by Hassan Fathy. Various

shaped domes decorated by intricately laid bricks formed fascinating geometric patterns. Then there were the courtyards – some small, some large, some square, some rectangular, some with arcading, some with iwan recesses. Khans, or caravanserais, provided safe haven to travelling merchants and pilgrims; their courtyards with rooms at each end had fireplaces to ward off winter cold.

Bam had a historic mix of religions. I visited a nineteenth-century courtyard house built by a wealthy Jewish merchant which was being restored by the Iranian Cultural Organisation as part of a general restoration project covering the whole fortified area. Numerous historic events have been recorded in Bam connected to the Zoroastrian faith that first took root in Persia in about 600BC. There is evidence of other links to

Christianity and to Judaism and, with the advent of Islam, to its communities – the Shia, Sunni, Ismaili, and no doubt Sufi. From the beginning of the sixteenth century until the eighteenth, the city flourished, being on the trade route joining the Persian Gulf to India and Pakistan. The citadel was evacuated to avoid political reprisals in the 1780s, but civilians remained in the fortified town until its decline in the mid-nineteenth century. Thereafter soldiers occupied it until 1931 since when the old city and citadel have lain empty.

I was in Iran in December to attend the ninth International Conference on the Study and Conservation of Earthen Architecture, Terra 2003 in Yazd, which lies between Tehran and Bam. When I arrived in Bam, I discovered my paper exactly described the specific structural

technique used in its historic walls and buildings – a different method of construction to that used in the modern areas of the town where there was the greatest loss of life.

The background to my paper was my identification, some 25 years ago, of a particular form of wall construction used in the historic forts and towns in Oman, which I called the 'layered technique'. A continuous render is taken up the sides and over the top of the core material of a wall, the core material being some three courses of mud bricks about forty centimetres high. Over the years, during architectural and archaeological projects I have traced this technique throughout an area stretching from south-west Iraq, through the Jordanian desert, across the Arabian peninsula to Yemen and Oman, then south to Zanzibar. Now I have found it in his-



Bam's citadel is built on top of an immensely ancient mound in which the unexplored remains of successive civilizations are imposed on each other. Before earthquake.



Domes, vaults and arcades before earthquake.



From citadel before earthquake, with old town in foreground and, beyond, new (where there was much greater loss of life).



Layered mud-brick construction which, claims Walls, is more resistant to earthquakes than modern cement mixtures.

toric structures in Iran, from Tehran to Bam. In the buildings I have seen, various combinations of materials have been used, from earth renders with hand formed and box-made mud bricks to harder lime-gypsum renders with stone, but the essential feature of the layering has been there. The earliest example I have come across was in Bahrain, where I found a wall with squared stones on one face backed by courses of smaller stones, enveloped by a render. This dated from 800 BC, and it can be assumed that this was preceded by hundreds of years of experiment. The advantage of this system is that if the external render is damaged –

by the elements or enemy attack – attrition is restricted to specific layers and does not spread to the layers above or below.

Looking at photographs of Bam since the earthquake, I am convinced that the old city and citadel can be reconstructed and returned to their mystical splendour. I have successfully restored buildings of similar construction in Bahrain and Zanzibar by following the layers and replacing damaged renders systematically and with compatible materials. And we could add a new dimension by identifying the direction in which the builders constructed the walls, as I found in Bahrain.

Re-plastering a layered wall in one continuous coat, or cutting it back and inserting an outer face of fired bricks, can never benefit a historic structure. So I worry for Bam when I read of ‘super-adobe’ buildings constructed of sandbags filled with a mixture of cement and mud, connected by barbed wire for reinforcement. To say that such constructions would be indistinguishable from Bam’s original buildings makes my hair stand on end. On the other hand, ‘super-adobe’ buildings could house the inhabitants of the modern city quickly and cheaply with readily available materials. I also worry that, in the old city, speed and need may tempt the cement brigade to push their products, and that earthquake strengthening measures may be introduced to the detriment of the historic fabric.

So much for the above ground structures, but what about the *qanat* (aqueduct) systems that for millennia have criss-crossed the desert to bring water from the mountains to Bam, and other oases of the region? What happened to these wonders when the earthquake struck?

Bam is the leading example of an indigenous architecture that expresses the common historical and cultural roots of ancient peoples spread over a vast region of the world well before modern geo-political boundaries were drawn. Its tragic devastation provides an opportunity for three major areas of learning: first to undertake a detailed archaeological survey of the mound; second to restore sensitively and with compatible materials the extant structures; and third to re-establish an appreciation of the common historic and cultural roots which once upon a time bound the peoples of the whole region.

ARCHIE WALLS



Pre-earthquake court with traditional Persian *iwān*.



After earthquake: Walls believes that devastated citadel and city can be reconstructed.