



# Why Bam Death Toll Was So High

巴姆地震死亡人数为何这么多

By Tania Branigan, Brian Whitaker and Brian Tucker

**译者点评:**2003年12月26日,伊朗东南部的巴姆古城发生里氏6.3级(亦有专家称为6.8级)强烈地震,造成3万多人丧生,数万人受伤,这座千年古城90%以上的建筑物倒塌,大量历史古迹被毁,损失惨重。巴姆地震伤亡为何如此惨烈?为了回答这个问题,我们特把英国《卫报》和另一家报纸的两篇分析文章综合起来。这两篇文章是3名记者对一些地震专家的采访。这些专家把巴姆地震同加利福尼亚和日本发生的地震加以比较,主要从巴姆建筑上的问题深入分析了造成大量人员伤亡和破坏的原因,呼吁人们从中吸取教训。我们国家也有地震多发区,看看这些专家的分析,听听他们的意见,也许对我们有参考价值。

Many of those killed by the earthquake in Bam died only because of poor building methods and a lack of proper regulation, an expert on the devastated city said on December 27, 2003.

In Iran, as in many developing countries, tremors that ought to be survivable often bring human tragedy on a vast scale because buildings collapse on top of people. Two days before Christmas, California was struck by an earthquake similar in magnitude to the one that hit Iran Saturday, but only three people died, thanks largely to safer construction methods. A tremor measuring 8.0 caused just 500 injuries and no deaths in Japan in September 2003.

Bam, in contrast, was a disaster waiting to happen. Efforts to bring industrial development to what was a backward agricultural area caused a population boom and a shortage of housing, which local builders tried to meet with cheap, jerry-built homes, or by adding extra floors to existing houses. "Many buildings collapse [even] without earthquakes, because of the poor construction," said Professor Mohsen Aboutorabi of the architecture department at the University of Central England, Birmingham, who has worked in Bam. ▶

研究级于地震的伊朗巴姆市的一位专家2003年12月27日说,在巴姆地震丧生的人中,许多人是由于建筑方法不得当和缺乏适当的规章制度而死亡的。

如同许多发展中国家一样,在伊朗,人应该能够幸存的地震常常带来巨大的人类悲剧,原因是建筑物倒塌把人压在底下。圣诞节前两天,加利福尼亚发生地震,震级同伊朗星期六发生的地震差不多,但只有3人死亡,主要是由于建筑方法较安全。2003年9月,日本发生的一次8级地震只造成500人受伤,没人死亡。

与此形成对照的是,巴姆是一场迟早要发生的灾难。要给巴姆这个落后农业区域带来工业发展的努力造成人口激增和住房短缺,因此,当地的建房者就设法用廉价的劣质材料建成的住房来满足需要,或者在现有的住房上添加楼层。在巴姆工作过的英国伯明翰中英格兰大学建筑系教授穆赫辛·阿卜托拉比说:"因为建筑质量差,即使没有地震,许多建筑物也会倒塌。"▶

"There are building regulations, but they haven't been enforced except for highrises. People are desperately in need of housing so the authorities overlook the code of building for earthquakes," he said. Much of the building work is done by property owners themselves, using untrained local labour. There has also been little research into low-cost techniques to protect buildings in the area against earthquakes, he added. Building materials are often inadequate for normal purposes, let alone for use in an earthquake zone. Typical houses are constructed of burnt brick, with mud and lime for the bonding. "On my last trip to Iran I banged two bricks together and they became like powder. Demand for materials is so high that manufacturers don't stick to any standards," Prof. Aboutorabi said. "The cost of cement is very high, so they don't use much." Ideally, houses in earthquake-prone regions should have lightweight pitched roofs, closely bonded together, he said. But builders in Bam had largely abandoned the use of corrugated metal—which would be suitable—because of short supplies and a belief that it does not last long.

Instead, they used industrial materials without understanding their properties, he said. This results in lethally<sup>2</sup> heavy roofs and ceilings. Many roofs are supported by metal beams between traditional brick arches. On top of that they put a layer of concrete and waterproofing. "The ends of the beams sit freely on the walls, so with any shake, if one goes, the whole roof collapses," Prof. Aboutorabi said. Although Bam had few tall buildings, in recent years the high cost of land had encouraged families to abandon the traditional style of single-storey homes, with rooms set around a courtyard, in favour of two or three floors, adding to the danger in the event of an earthquake. Despite the lack of safety precautions, the Iranian authorities are well-accustomed to dealing with the aftermath of earthquakes.

The earthquake devastation in the ancient Iranian city of Bam seems almost incomprehensible to us. Yet, in the past five years, scenes similar to those we are seeing in the news media have occurred on a smaller or similar scale in Afghanistan, Turkey, India, El Salvador and, most recently, Algeria. These earthquakes killed more than 60,000 people and left hundreds of thousands homeless. Iran, of course, is no stranger to earthquakes: In 1990 a powerful quake killed 35,000 people in the regions of Gilan and Zanzan, leaving about a half-million homeless.

And yet the truth is that such awful loss of human life and structural devastation need not occur. Consider ►

他说：“有建筑上的规章制度，但除了高层楼房以外根本就没有执行。人们急需住房，因此，有关当局忽视了预防地震的建筑规章。”盖房多半是由房主自己干的，使用的是当地未经训练的劳动力。他接着说，而且还很少研究使该地区的建筑物抗震的廉价技术。建筑材料用于普通目的都常常不合格，更不要说在一个地震多发区使用了。典型的房屋是用烧制的砖，再用泥巴和石灰砌起来的。阿卜托拉比教授说：“上次我去伊朗时，我拿两块砖放在一起敲，砖就成了粉末。对建筑材料的需求很大，生产者也就不遵守任何标准。水泥的造价很高，他们用得不多。”他说，合乎理想的是，地震多发区的房屋应有轻的斜屋顶，紧紧地结合在一起。但巴姆的建房者多半没有使用本应使用的波纹金属制品，原因是供应短缺，而且被认为不耐用。

他说，他们并不了解使用的工业材料的特性。结果是，屋顶和天花板很重，这是要命的。许多屋顶是由金属横梁在传统的砖拱形结构之间支撑的。在屋顶上，他们抹了一层混凝土和防水层。阿卜托拉比教授说：“横梁末端同墙没有固定在一起，因此，只要有震动，如果有一根脱位，整个屋顶就塌了。”虽然巴姆很少有高层楼房，但近年来，由于地价高，各家各户都放弃了传统的在院子里盖单层平房的方式，而盖起了两三层楼房，这就使发生地震时的危险性加大了。尽管缺乏安全预防措施，但伊朗当局很习惯于处理地震后的情况。

伊朗巴姆古城的地震所造成的破坏对我们来说几乎是不可理解的。然而，过去5年来，我们从新闻媒体上所看到的类似的情景在阿富汗、土耳其、印度、萨尔瓦多和最近的阿尔及利亚都出现过，其震级比巴姆地震小一些或差不多。这些地震使6万多人丧生，几十万的人无家可归。当然，地震对伊朗来说并不陌生。1990年，在吉兰和赞詹地区发生的地震使3.5万人丧生，大约50万人无家可归。

然而，事实是，如此可怕的生命损 ►

1. 偷工减料建造的  
2. 致命地，杀伤性地，意思同 fatally

three major recent California earthquakes: Loma Prieta in 1989, with a 6.9 magnitude; Northridge in 1994, with a 6.7 magnitude, and San Simeon/Paso Robles on Dec. 22, 2003, with a 6.5 magnitude. These relatively strong earthquakes in California resulted in a total of 125 deaths, while this week's Iranian quake, with a somewhat lesser magnitude, may have claimed 40,000 lives. Since 1950, richer countries have reduced the average number of deaths per fatal tremor by 90 percent. Meanwhile, poorer countries have shown no reduction in death rates at all.

What is the lesson? Although we cannot prevent earthquakes, we can prevent earthquake disasters. With proper earthquake risk reduction, we have the power to save lives and defy the merciless cruelties of nature. Risk reduction is the only sustainable, affordable and effective solution to the problem of earthquake disasters. This is accomplished through risk assessment, public education and awareness, building-code enforcement, training of masons and engineers, emergency-preparedness planning, and retrofitting<sup>3</sup> of buildings and infrastructure.

The cost of such risk reduction is relatively low when compared with the monetary and human losses that can occur when an earthquake strikes. In Bam, up to 90 percent of residences can no longer be inhabited, and early reports indicate that almost all public buildings have collapsed. When a community loses its core communal buildings and infrastructure, it loses its ability to repair itself. This loss of ability to rebuild requires massive infusions of external aid. Although the international outpourings of relief assistance and sympathy are welcome as antidotes<sup>4</sup> to the disaster, prevention is the only sustainable solution to a problem inherent in the composition of our planet.

When thoughts turn from rescuing the survivors of the earthquake to rebuilding Bam, some significant fraction of the available resources, both human and fiscal, should be directed to training local masons in how to build earthquake-resistant structures. Too often in the past, well-meaning organizations, in their hurry to provide shelter against severe weather conditions, have built what are essentially rowhouses of concrete boxes. Sometimes these houses are not used by the local people, who sooner or later build again in the traditional, earthquake-vulnerable way. Now that the local population of Bam and the authorities responsible for community safety understand the threat of earthquakes, steps must be taken to reduce the region's earthquake vulnerability. A large number of houses will have to be either built or extensively re- ▶

失和建筑上的破坏是不必发生的。看看加利福尼亚近年来发生的3次大地震:1989年在洛马普利塔发生的6.9级地震、1994年在北里奇发生的6.7级地震以及2003年12月22日在圣西米恩和帕索罗布尔斯发生的6.5级地震。在加利福尼亚发生的这些相当强的地震总共死了125人,而本周在伊朗发生的地震,虽然震级相对小一些,却大概夺走了4万人的生命。自从1950年以来,富裕国家每次致命地震平均死亡人数下降了90%。与此同时,穷国的死亡率根本就没有减少。

教训是什么?我们虽然不能阻止地震,但我们能防止地震所造成的灾难。只要采取适当的减少地震风险的措施,我们就有能力挽救生命并抗拒自然的残酷无情。减少风险是解决地震灾难问题的惟一可持续的、负担得起的和有效的办法。实现这个办法要通过风险评估、公众教育和意识,实施建筑规范,训练砖瓦匠和技师,应急计划并改造建筑物和基础结构。

同发生地震时所造成的金钱和人员伤亡损失相比,这种减少风险的费用相对较低。在巴姆,不能再住人的房子达到90%,而且,初步报告显示,几乎所有的公共建筑物都倒塌了。当一个社区失去了核心的公共建筑物和基础设施,它就失去了重新修复的能力。失去这种重建的能力就需要注入大量的外来援助。国际上提供的大量救灾援助和表示的同情作为对抗灾难的手段来说是受欢迎的,但预防仍是解决我们地球的结构所固有的一个问题的惟一持久的办法。

当注意力从搜救地震的幸存者转向重建巴姆时,现有的人力财力中相当大的的一部分应该用于训练当地的泥瓦匠,教他们如何建抗震结构的建筑物。过去,好心好意的组织在匆忙为恶劣气候条件下的灾民提供住处时,常常建了基本上是一排排混凝土的联立小屋。有时,这些房子不是由当地人使用,当地人迟早又以不抗震的传统方式建房。既然巴姆当地的人和负责社区安全的当局认识到地震的威胁,就必须采取措施减少该地区抗震的薄弱环节。需要建设或广泛维修一大批房子,因此,现在是训练新一代泥瓦匠掌握正确施工技术的时候了。这应该成为由地区银 ▶

paired, and this is the time to train a new generation of masons on how to do things right. This should be a requirement of all reconstruction projects funded by regional banks or national and international aid organizations.

While we mourn the victims of the Bam earthquake and sympathize with the survivors, we cannot ignore the lesson learned from this tragedy. Our energies must be directed to avoiding such disasters in earthquake-prone regions in the future. Concerned citizens, governments, corporations, multilateral development institutions and nonprofit organizations must act together now to help vulnerable communities overcome the barriers to implementing the risk-reduction measures noted above before another deadly earthquake strikes.

"We see different types of earthquakes affecting different types of construction. That's very, very important for helping us improve our building codes and our engineering practices," said Dr. David Schwartz, an expert on earthquakes, who has spent his life studying earthquakes and has traveled the world to see what they can do. He says California clearly has learned the lesson when one compares the death from the two recent earthquakes; one in California and the other in Iran. "The major difference between California and many parts of the world is our construction and our concern with really saving lives during major earthquakes," he said. ■

行或国家的和国际的援助组织提供资金的所有重建项目的一个要求。

当我们悼念巴姆地震的死难者并同情幸存者的时候,我们不能忽视从这次悲剧中所吸取的教训。我们的精力必须用于避免今后在地震多发区出现这样的灾难。有关的公民、政府、公司、多边发展机构和非营利组织现在必须共同行动,在另一场致命地震发生之前,帮助薄弱社区克服实施上述减少风险措施的障碍。

一直研究地震并巡游世界各地看看地震会造成什么后果的地震专家戴维·施瓦茨博士说:"我们看到不同类型的地震对不同类型的建筑所造成的影响。这对于帮助我们改进我们的建筑规章和工程实践是非常非常重要的。"他说,当人们把最近发生的两次地震,即加利福尼亚的地震和伊朗的地震所造成的死亡人数加以比较的时候,就可以看出,加利福尼亚显然吸取了教训。他说:"加利福尼亚和世界许多地方的主要差别在于我们的建筑以及我们对大地震发生时真正挽救人的生命的关心。"

(时文 译自外报综合)

3. retrofit 翻新改造

4. antidote 本意为解毒剂,引申为对抗手段

## Afghans Agree on Historic New Constitution

阿富汗通过具有历史意义的新宪法

Afghanistan's constitutional convention agreed on a historic new charter on Jan. 4, overcoming weeks of division to hammer out a compromise meant to bind together the war-ravaged nation's mosaic of ethnic groups. The final accord is expected to give Karzai the strong presidential system he had been insisting on. The charter makes the president commander in chief of the armed forces, charges him with determining the nation's fundamental policies and gives him sweeping power to push through legislation. 2004年1月4日,阿富汗宪法大会通过具有历史意义的新宪法,这是在克服了数周的分歧后所做出的让步和妥协。这是为了把民族众多、饱经战乱的国家凝聚在一起的努力。最后达成的一致将赋予卡尔扎伊一直所坚持的强势总统制。宪法规定总统是武装力量的总司令,他可以决定国家的基本政策,并且授予他越过立法机构的绝对权力。

(丢丢 摘译自 AP Jan. 4, 2004)

## North Korea Offers to Freeze Nuke Program

朝鲜表示愿意冻结其核计划

North Korea, in what it described as a "bold concession," offered on Jan. 6 to refrain from testing and producing nuclear weapons and to halt the operation of its nuclear power facilities in exchange for progress in six-nation talks on the standoff. Secretary of State Colin Powell called the offer "positive." 朝鲜1月6日表示愿意停止试验和生产核武器,并中止其核电设施的运行,以换取六方会谈取得进展。朝方将这一提议称为"大胆的让步"。美国国务卿鲍威尔称朝方的提议是"积极的"。(黄景豪 摘自 AP &

International Herald Tribune Jan. 6, 2004)