



EARTHQUAKE DAMAGE ASSESSMENT AND MITIGATION RECOMMENDATIONS

Following the 2002 Nahrin Earthquake in the Baghlan Province of Afghanistan

PROJECT DESCRIPTION

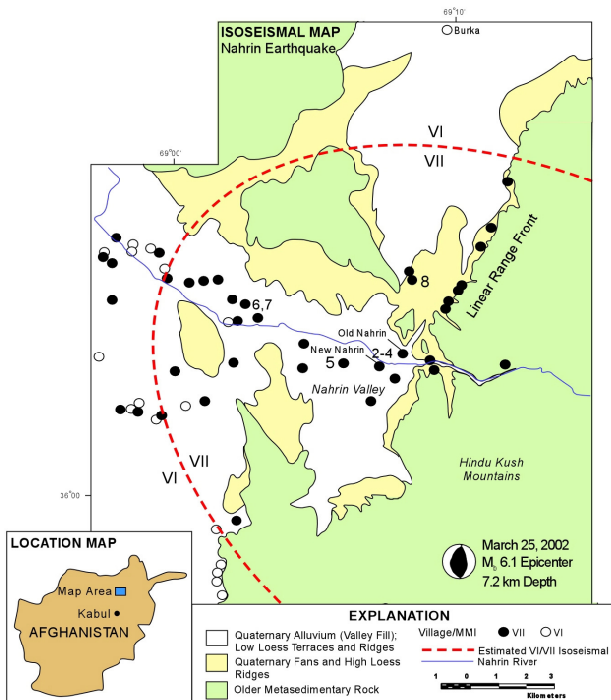
On 25 March, 2002, a destructive earthquake of M_w 6.1 struck the city of Nahrin and nearby villages in the Baghlan Province of northeastern Afghanistan (see figure). The United Nations and Afghan authorities estimated the death toll from the earthquake to be over 2,000, with about 20,000 families impacted by the earthquake. *Earth Consultants International (ECI)* was asked to evaluate the future seismic hazard to building sites in the Baghlan Province. We conducted a survey of damage in 68 villages affected by the earthquake and found that areas within 25 kilometers of the epicenter experienced Modified Mercalli intensities of between VI and VII. Shaking intensities were strong enough to cause complete building collapse in many villages.



Photo Showing Earthquake Damage in One of the Villages

OBSERVATIONS AND RECOMMENDATIONS

ECI's geologists found site conditions were an important factor in the distribution of damage in the Nahrin area: Houses built on ridge crests and on low fluvial terraces suffered major damage, whereas structures built on bedrock and alluvial fans along the range front of the Hindu Kush Mountains or on high terraces along the Nahrin River (see figure) suffered comparatively less damage. Building failure resulted primarily from the weak mud-block construction used in most houses. The lack of bracing in the walls and corners led to failure at corners and subsequent roof collapse. In several villages, mosques were constructed to a higher standard and suffered significantly less damage. The mosques often had structural supports tied to concrete foundations. Had houses been built to the same standards as most mosques, loss of life would have been greatly reduced. Given these observations, we recommended that villages be sited on bedrock or alluvial fans, if possible, and that new buildings incorporate the structural elements that were found to prevent collapse.



Location Map Showing Assessed Villages
in the Baghlan Province of Afghanistan

