Field Assessment Report


December, 2005

Prepared by

Architectural Heritage Division
INTACH

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Field Assessment Report


Preface

Earthquakes are unfortunate natural disasters that strike a place unexpectedly often leaving behind trails of destruction. Tremors and after-shocks thereafter continue to haunt those who are brutally affected and it takes a while before normalcy is brought in. It is always overwhelming to find administration and other private enterprises acting responsibly and immediately to provide relief in cash and kind and support those who are in distress. People from all walks of life and from places far and near join in and support those in need. While efforts usually concentrate towards offering relief in terms of providing food, clothing and shelter to the needy, it is often realised that there is little or no attention towards buildings and sites of historical or architectural merit. Indeed life shall assume priority in matters of rehabilitation but ignoring our precious heritage altogether may also not be a very far-fetching idea.

INTACH, with its given mandate to identify and look after the ‘unprotected’ heritage, has always risen to the occasion of assessing damages to historic buildings caused by natural disasters. In case of the recent earthquake affecting western parts of Jammu and Kashmir INTACH sent a team of conservation architects and architects who visited parts of Jammu, Rajauri and Poonch to assess damages to the historical buildings. This visit coincided with the visit of UNESCO team who visited Srinagar and parts of Uri and Baramulla. Thus there was an endeavour of these two organisations to jointly take stock of damages to historic buildings and sites, and to compile information for any future action. One hopes that the information collected from this field survey is useful for researchers, policy makers, conservation architects, structural engineers and all those who wish to learn from these disasters and provide knowledge for how to go about protecting the built heritage after a natural disaster strikes.
Introduction

The infamous earthquake struck large parts of Kashmir on either sides of the LOC (Line of Control) on the morning of 8 October, 2005 at approximately 0920 hours (Indian Standard Time). The epicentre¹ of the earthquake was near Muzzafarabad (within Pakistan Occupied Kashmir) and it was felt throughout north India and places as far as Gujarat and Uttar Pradesh. It measured 7.6 on Richter scale and lasted for approximately 26 seconds. According to eye witnesses, buildings and trees swayed menacingly, and soon buildings, mostly old, started collapsing everywhere and clouds of dust engulfed places and appeared on horizon. There have been numerous after-shocks ranging from 4 to 6 on Richter scale but these are not reported to have caused any damages except creating panic amongst those already affected.

The severity of destruction could be gauged from the fact that several towns and villages have completely wiped out within Pakistan Occupied Kashmir and major damages are reported from the Indian side also. The official figures put the death toll in Pakistan on 87,000 and more than 1,00,000 injured, figures in India are less severe with official figures of those who died and were injured at approximately 1,300 and 6,600 respectively.

¹ The epicentre is a point on the earth's surface where an earthquake or an underground explosion originates. This point is usually directly above the actual location of the release of energy inside the earth. Seismic waves originate spherically out of the epicentre.
INTACH’s Response

INTACH sent a team comprising conservation architect and architects to the parts in Jammu and Poonch regions affected by earthquake. Their visit coincided with a team sent by UNESCO to Srinagar, Baramulla and Uri. The purpose of the team was as follows:

- To assess damages to historic structures in Jammu and Poonch region; and
- To understand and analyse causes of damages to historic structures

INTACH team’s itinerary

7 November, 2005 : Left for Jammu (from Delhi and Srinagar)
8 November, 2005 : Visited Mubarak Mandi Complex and Poonch House
9 November, 2005 : Left for Poonch; en route, visited Chingas Sera
                   Reached Poonch in the evening
10 November, 2005 : Visited Poonch Fort;
                   A reconnaissance of the Poonch town – surveyed major
                   historical buildings damaged in earthquake
11 November, 2005 : Visited Moti Mahal and Baldev Mahal;
                   A reconnaissance of the Poonch town – surveyed major
                   historical buildings damages in earthquake
12 November, 2005 : Left for Riasi
13 November, 2005 : Visited Bhimgarh and Zoravar forts, Riasi
14 November, 2005 : Left for Jammu
15 November, 2005 : Left for Delhi and Srinagar
Scope of Work

The information that was received at the INTACH headquarters before the team went to the earthquake-affected western region of Jammu and Kashmir was scanty and inaccurate. Media had reported damages only to Poonch fort and Moti Mahal in Poonch, Mubarak Mandi in Jammu and a fort at Riasi. A few buildings were reported damaged in Srinagar including the famous Jami mosque. Severe damages and collapses however were reported from Uri and Baramulla to building largely residential and commercial. This report however deals with the region of Jammu and Poonch only, including Riasi, a small town approximately 45 kilometres north of Jammu were an extensive fieldwork was conducted by the survey team.

Initially the team was given a mandate of visiting only four structures. These were as follows:

- Mubarak Mandi complex in Jammu;
- Moti Mahal and Poonch Fort, Poonch; and
- Bhimgarh Fort, Riasi

With guidance and support from the INTACH-Kashmir Chapter and local administration, the teams went in different parts of Jammu, Poonch and Riasi to identify other (apart from the four sites mentioned above) historical buildings damaged due to earthquake. As the field survey went underway we realised that many more historical buildings have suffered damages at these places and these needed a closer inspection to take stock of damages to various historical buildings and consequently develop an understanding of failure patterns. Photographic documentation was done for all these buildings; notes and sketches were prepared at the site to depict structural failures. Assessment of damages was also established and these are also presented in the report. The report ends with a series of recommendations and precautions to be taken in the damaged buildings.

The report however does not deal with modern buildings that are beyond INTACH’s mandate. Also the report is an account of the observations made and does not deal with technical aspects of structural engineering pertaining to earthquake for which a qualified structural engineer should be consulted.
Methodology

Immediately after the earthquake, a team of conservation architects and architects was organised by INTACH to visit Jammu, Poonch and Riasi. The team preferred to delay the visit as it was considered appropriate, and as advised by the INTACH-Kashmir convenor, that any humanitarian relief work should reach the victims first. Once the initial wave of humanitarian assistance subsided and victims were rehabilitated, INTACH team undertook their visit to all these places. The team spent a week travelling to different parts of Jammu and Poonch towns.

A performa was prepared to assess and record damages to historic buildings and these forms were filled in at the site for each building. Each building was photo-documented and all damages were recorded and spot analysis for reasons for failures was studied. Recommendations are therefore based on the study of the affected buildings.

After the data collected from site, the emphasis

Acknowledgements

The team would sincerely like to thank all officers and individuals those who helped it in accessing the damaged buildings and sites and provided us valuable information and an insight regarding their history or function.

Chairman and Member Secretary, INTACH
Mr. Salim Beg, DG – Tourism, Government of J&K, and INTACH Convenor for Jammu and Kashmir
Director – Archives, Government of J&K
DC, Poonch
SDM, Riasi
Col. Sant Ram, Hq. 93 Brigade
Maj. Iyengar Madhavan, Hq. 93 Brigade
SDM, Riasi
Tehsildar, Riasi
The Team

The team that undertook the survey comprised following members:

Janhwij Sharma, Conservation architect
Saima Iqbal, Architect
Hakim Sameer Hamdani, Architect
Jabeen M. Khan, Architect
Abid Khan, Architect

Besides, we would like to express our heart-felt thanks to the officials and lay people of Poonch and Riasi, who were kind enough in offering hospitality and showing us all around.

Field Observations

The report is the account of field observations for all prominent historical buildings and complexes visited by the INTACH team.
JAMMU

The team from INTACH first visited Jammu city to inspect historic buildings damaged by earthquake. According to information available from various sources, not much damage was reported from Jammu. However, sources from the Department of Tourism informed that parts of the Mubarak Mandi complex had suffered serious damages. So the team visited the Mubarak Mandi complex to inspect the damages to various buildings within the complex. On further enquiries it was found out that another old building, Poonch Mahal, now Institute of Music and fine Arts, had also suffered partial collapses. Apart from that no other information was available for any other old or historic building having suffered any damages.

A total of 8 structures were looked into in Jammu and these are as discussed below.

<table>
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<tr>
<th>Gol Ghar, Mubarak Mandi Complex, Jammu</th>
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<th>Significance</th>
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<td>Gol Ghar is a large four storey construction, largely in brick masonry located towards the southern part of the complex. Its one of the most impressive structures commanding excellent view of Tawi river. The building has a large open-to-sky courtyard in the middle with rooms on all sides. The entire building was earlier gutted down in mid 1980s as a result roofs and floors at</td>
<td>The building has suffered considerable damages after the earthquake. Portions of the building have collapsed completely while others have severe structural cracks. Debris can be seen</td>
<td>Restoration of the Gol Ghar should be a priority as it is one of the prime archaeological structures within the mandi complex. Portions of the structure are in an extremely precarious condition, hence, priority should be accorded to consolidation and propping of the</td>
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different levels had already collapsed. | lying all over the place and that includes broken columns, failed arches, etc. | affected portion. 

Retrofitting and consolidation of the walls standing in isolation. 

All broken arches and columns to be repaired and retrofitted.

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<td>Rani Charak’s palace is a three storey structure adjoining Toshakhana overlooking river Tawi. Detailed investigations could not be carried out for the palace as portions of the building were locked at the time of the visit.</td>
<td>The building has suffered minor damages after the earthquake. There are minor collapses at the roof level where a portion of the chajja has collapsed. Another building, adjoining</td>
<td>Retrofitting of the entire building is required. All broken arches and columns to be repaired and retrofitted. Stitching of cracks on the external elevation is required.</td>
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to it, but part of the palace itself, has vertical cracks on its external elevation, running from top to the bottom through window openings.

All affected arches and openings to be repaired.

Damaged parapet to be repaired using historic building material and original designs.

Building should be put to an effective reuse to ensure its maintenance.

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<thead>
<tr>
<th>Toshakhana, Mubarak Mandi Complex, Jammu</th>
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<td>Toshakhana is a three storey structure adjoining Toshakhana overlooking river Tawi. On the ground and the first level, there exist exquisite wall paintings and <em>papier machie</em> ceilings. One of the chambers has elaborate mirror work in its wall panels.</td>
<td>The building has suffered minor damages after the earthquake. There are minor collapses at the roof level where a portion of the chajja has collapsed. Vertical cracks have appeared at several places inside the building and</td>
<td>Structural retrofitting of the entire building is required. Damaged parapet to be repaired using historic building material and original designs. Restoration of wall paintings, <em>papier machie</em> ceiling and mirror panels is required.</td>
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there are damages to wall paintings and *papier machie* ceiling.

Building should be put to an effective reuse to ensure its maintenance.

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<tr>
<th>High Court and UPSC buildings, Mubarak Mandi Complex, Jammu</th>
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<td>High Court and UPSC buildings are twin structures along the edge of the triangular open space. These are largely two storey structures with intricate balconies, exterior with intricately carved stone columns and balconies.</td>
<td>The building has suffered minor damages after the earthquake.</td>
<td>Structural retrofitting of the entire building is recommended. Building should be put to an effective reuse to ensure its maintenance.</td>
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### Divisional Commissioner’s Office, Mubarak Mandi Complex, Jammu

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<td>Divisional Commissioner’s buildings are twin structures along the edge of the triangular open space. These are largely two storey structures with intricate balconies, exterior with intricately carved stone columns and balconies.</td>
<td>The building has suffered minor damages after the earthquake.</td>
<td>Structural retrofitting of the entire building is recommended. Building should be put to an effective reuse to ensure its maintenance.</td>
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### Dogra Arts Museum, Mubarak Mandi Complex, Jammu

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<td>Dogra Art Museum is also a part of the Mubarak Mandi complex located next to the</td>
<td>The building is being maintained by the museum authorities and is in a</td>
<td>Structural retrofitting of the entire building is still recommended.</td>
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Field Assessment Report on Damages to Historic Properties in Jammu, Poonch and Riasi, Jammu and Kashmir

UPSC building. It is also called Pink palace owing its name to the pink plastered walls.

The museum building comprises a large single storey hall in front lined with rooms on all sides.

reasonably good condition. There are no visible damages to the structure except for hairline cracks at a few places.

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Main Gateway, Mubarak Mandi Complex, Jammu

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<td>Main gateway is located adjacent to the Divisional Commissioner’s office and is one of the two gateways surviving in the complex. The gateway is a two storey high structure comprising a large arched opening sandwiched between two structures.</td>
<td>The upper portions of the gateway structure were locked at the time of the visit hence one cannot comment on the condition of its interior or of the roof. The gateway structure is not in a good condition and this is due to neglect and lack of maintenance. Growths of trees, failing masonry at places are some of the major reasons for their deterioration of the structure.</td>
<td>Structural retrofitting of the entire building is recommended. Building should be cleared of all vegetation growing on its façade and masonry repair works to be carried out.</td>
</tr>
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</table>
There are no visible damages to the structure due to earthquake except for hairline cracks at a few places.

### Significance

Poonch House is built around 1930s by the erstwhile Poonch chieftain. Later after Independence it came under the ownership of the Culture Academy, Jammu and Kashmir Government who converted this erstwhile residence into the Institute of Fine Arts.

The building comprises a symmetrical structure with corridors and a grand staircase in the middle and large rooms, some with fire places on either side on the two floors.

### Condition

Building suffers from lack of maintenance. Lime plaster is in an advanced state of disrepair at many places. Plant and microbial growth has occurred along the walls of parapet at terrace level. The building is also suffering from water penetration from terrace because of faulty slopes. This problem was earlier addressed by re-laying the terrace lining but that has not helped much. Consequently, I-sections are rusted at many places.

### Recommendations

Structural retrofitting of the entire building is recommended.

Broken parapet in the northern portion needs to be repaired.

Plaster cracks need to be opened up at places to check the extent of damage. At places, tell-tale signs need to be put on so that one can see whether these cracks are living or not.

Vegetation needs to be
The building has a load bearing brick masonry structure with the ceiling supported on a series of steel I-sections, encased within concrete. The building is covered with lime plaster.

| Earthquake has damaged the structure further although the damage is not very severe. The jolts have in fact augmented the already existing structural problems. |
| The parapet wall along the northern portion of the building has collapsed. |
| One of the corner rooms on the southern side on the first floor has developed severe cracks due to earthquake. |
| Cracks in plaster have developed at many places due to vibrations during the earthquake. |
| removed from the terrace and wall surfaces wherever these exist. At places, trees have been removed but their live roots remain within the structure. |
| Water seepage problem can be addressed by correcting slopes of roofs. |
| It is important to check the rusted I-sections in jack arch ceilings by opening up the ceiling at select places. Those that are completely rusted should be changed. |
MORE IMAGES

Fig. 1: Interior of Golghar

Fig. 2: View of river Tawi from Gol Ghar
Fig. 3: Damages to one of the portions of Gol Ghar. Notice that the front corridor has completely collapsed.

Fig. 4: Damages to Gol Ghar both because of the earthquake and a fire that broke out in mid-80s.
Fig. 5: A portion of the Golhar completely collapsed. Debris included broken masonry columns. This damage has largely been due to the arch failure.

Fig. 6: Collapsed portion of the Golhar lying at the base of the fort
Fig. 7: Arch failure in Golghar. Bricks in arch have come out because of the jolt and wide diagonal structural crack between the arch and the opening above.

Fig. 8: Collapsed masonry from the arches including broken masonry column in Golghar.
Fig. 9: Another failed brick masonry arch in Golghar

Fig. 10: Wall paintings within Toshakhana

Fig. 11: Debris lying in one of the corridors of Toshakhana
Fig. 12: Cracks within wall paintings inside Toshakhana

Fig. 13: Decorative mirror work and paintings, Toshakhana hall
Fig. 14 a, b and c: External ornamentation on Rani Charak's palace
Fig. 15: Collapsed parapet of Poonch House. Cracks are accentuated due to the presence of roots of the Pepul tree growing on the terrace.

Fig. 16: Damages to roof also due to rusted iron sections embedded within the flat ceiling.
Fig. 17: Hair-line cracks within plaster all over Poonch house

Fig. 18: Cracks running along the exterior surface near openings
Poonch

Poonch is approximately 230 kilometres from Jammu in north-westerly direction. It takes a complete day to reach there and that's largely due to ill-maintained narrow roads. The journey otherwise is picturesque. Rajauri and Surankot are the largest settlements en route while there are innumerable small settlements that dot the mountainous landscape along the Jammu-Poonch highway.

Rajauri and Surankot have constructions that are contemporary and brick and cement are chief building materials. Constructions in most villages are largely vernacular and stone and mud are principal building materials. Walls are usually made of random rubble masonry and roofs are flat, made of mud supported over timber elements with load transferred through wooden beams. However, of late, because of convenience and easy availability, mud roofs are replaced by CGI sheet roofs.

On the way, we kept making enquiries whether there were reports of any damages due to earthquake. It was interesting and heartening to observe that there were hardly any damages reported to any house, public building or a historical building. A little before Rajauri, we halted briefly at Chingas di Saran (Saran or Sarai is a Persian word for traveller’s inn) to examine damages, if any, and on going restoration works. The Sarai is under army occupation despite being protected by the state government, therefore, we were not allowed any photography of the structure. However, the structure, a heavy load bearing structure in random rubble masonry, is in a fine condition. The entire building was being re-plastered in lime concrete and repairs to masonry were being carried out at several places. Also, we didn’t find any damages due to the earthquake, which probably is due to its excessive dead-load.

We reached Poonch late in the evening and our halt for the next three nights was fixed at the PWD Guest house. PWD guest house was hit badly by the earthquake and the portion that we were staying in clearly appeared structurally unsound. There were huge punctures in the false ceiling because of stones falling from gable walls within rooms. One could see mangled furniture still lying within rooms. Not a comfortable sight after a tiring day’s journey!

Next day, we started our day by visiting the Deputy Commissioner, who himself was a victim of earthquake. Explaining him our objective, we then proceeded towards the city. The destruction within the city was evident and soon we were witnessing collapsed buildings, debris lying along the road, building material being salvaged and kept in piles, tents in open spaces sheltering the homeless. What was however reassuring was people who had come to terms with the disaster and that rebuilding process was ongoing.
Statistics showed only 2 deaths in the earthquake and that was also due to negligence. Locals maintain a silent thanksgiving and claim it was timing of the earthquake that saved lives. For instance, they say had the quake struck half an hour later, there could have been a huge loss of life as well as children in schools or office-goers would have all been potential victims of the jolt. Another interesting fact that was revealed was the manner in which destruction took place. As a commoner, it appeared as if destruction was selective and that only a part of the city was badly affected while the adjoining part was completely untouched! In one given situation, along one of the streets, one side was completely unaffected while the other side had grave devastation visible.

As per our mandate we visited all prominent historic buildings in Poonch to assess damages to them. A description of these is as mentioned below.

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<th>Poonch Fort, Poonch</th>
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<td>Poonch Fort is one of the most historic buildings of Poonch, and it has several layers of history embedded within its built fabric. It was originally built in the late Mughal period and there were subsequent additions during the Dogra and the British rule. The Fort is not protected and is under the occupation of the district</td>
<td>The entire complex even before the earthquake was not in a very good condition. Its various buildings were in different states of preservation. The complex was already in a state of disrepair and badly maintained. In fact, addition of building blocks/floors over existing structures was already causing over-</td>
<td>Owing to the nature of destruction within the fort complex, it is important first to carefully remove the debris so that one can access portions of the fort inaccessible at the moment. Care has to be taken that the historic material and details (carvings, etc.) be salvaged from the debris</td>
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The fort commends an excellent view of the city owing to its location. The complex comprises several buildings built at different levels.

The thick rampart wall, quadrilateral in shape protects the entire fort complex and is reinforced at corners by octagonal bastions. Within these walls, there are chambers or rooms being used for official purposes arranged around courtyards.

While old buildings within the complex are made of load bearing random rubble walls or Lakhori brick walls. New structures are, as usual, made of brick and cement.

There have been several inappropriate additions and alterations to the fort complex over the past several years. These additions, alterations have in fact compromised on the historicity of the fort in many ways. In recent years there have been major structural interventions. These include repair works, loading of structures and foundations underneath. At places towards the rear, there are fully grown pipul trees coming out of the wall fabric.

Earthquake has almost completely destroyed its rear southern and eastern portions where a portion of the building (it was a recent construction) has completely collapsed.

There are severe wide structural cracks on walls towards the external side of the fort making the structure unstable and unsafe. At places, joints between two walls have opened because of movement of walls in different directions.

Partial collapses can be seen at many places within the fort complex. Portions beneath the sloping roofs have collapsed from corners in several buildings. A small mosque structure within has suffered serious damages.

Cracks have appeared at several places in different building ranging from wide structural cracks to hairline and kept carefully at a safe place as these can give important clues while restoring the fort complex.

It is strongly recommended that a comprehensive conservation plan for the complex be prepared that focuses on its restoration and re-use besides structural retrofitting.

Portions that are completely collapsed need to be removed carefully. For major cracks, tell-tale signs need to be put in for monitoring movements, if any. At many places there are hairline cracks within plaster. Perhaps, plaster needs to be removed and redone completely.

Trees and other forms of vegetation need to be removed from the terrace and wall surfaces wherever these exist. At places, trees their live roots remain within the structure. These need to be killed permanently by injecting suitable chemicals.

It is important to have a thorough structural investigation done of the fort to inspect if there is any overloading taking place.
done in *nallah* stone, use of cement concrete in place of original lime. Introduction of RCC slabs at most floor levels (removal of original wooden flooring). The Durbar Hall, located on the western side was declared unsafe in 1988 (as per local sources).

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<td>Moti Mahal is one of the finest examples of palace architecture featuring colonial influence. The palace built in 1920s has a distinct Scottish appearance because of turrets at corners, chimneys, projecting windows over sloping roofs.</td>
<td>Moti Mahal structure at the outset appears to be in a fine condition. Externally, however one finds portions of the sloping roof covered with plastic sheets indicating a loss of material. The building before the earthquake was in a good condition.</td>
<td>Owing to the nature of destruction within Moti Mahal, it is important first to carefully remove the debris so that one can access portions of the building inaccessible at the moment. Care has to be taken that the historic material and...</td>
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condition. Only at places there were usual problems related to water seepage, flooring deterioration, penetration of vine roots within wall surfaces, etc. There was no structural problem whatsoever and the building was very well maintained by the MES (Military Engineering Services) wing of the Army.

In the interior, there are hairline cracks everywhere in its interior, which are probably only in the plaster and not penetrating deep into the masonry.

The first floor and the attic of the building have however badly been affected by the earthquake. There was a clear demonstration of the weakness of various building elements like chimneys, dormer gable walls, as these were not well supported or cross-braced. Gable walls, in fact, had been standing in isolation providing partitions within the attic and supporting the timber roof.

As a result, almost all the chimneys and most gable walls collapsed and fell on details (carvings, etc.) be salvaged from the debris and kept carefully at a safe place as these can give important clues while restoring the building.

It is strongly recommended that a comprehensive conservation plan for the building be prepared that focuses on its restoration and structural retrofitting.

What is critical is the handling of the chimneys and gable walls for these need to be well supported, cross-braced and structurally strengthened.

Portions that are completely collapsed need to be removed carefully. For major cracks, tell-tale signs need to be put in for monitoring movements, if any. At many places there are hairline cracks within plaster. Perhaps, plaster needs to be removed and redone completely.

It is important to have a thorough structural investigation done of the fort to inspect if there is any overloading taking place anywhere. Such anomalies need to be removed.
wooden floors below thus triggering a collapse. One finds debris in form of stones, wooden ceiling, other ornamental architectural elements, broken balusters, pieces of broken furniture lying all around. Consequently, there has been damages to the sloping roof as well and it had gaping wide holes at the time of the visit.

There have been damages to partition walls on the first floor and at a couple of places these were hanging precariously. Towards the rear of the building, at the first floor level, a toilet floor had sunk by more than 6” thus rendering is both unusable and unsafe.
Baldev Mahal, Poonch

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<td>Baldev Mahal is another fine complex with two main buildings and a few out-</td>
<td>Baldev Mahal structure at the outset appears to be in a fine condition.</td>
<td>Owing to the nature of destruction within Baldev Mahal, it is important first to carefully remove the debris.</td>
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<td>houses featuring colonial influence. The palace complex is also under the</td>
<td>The building before the earthquake was in a reasonably good condition.</td>
<td>Care has to be taken that any historic material and details (carvings, etc.) be salvaged from the debris and kept carefully at a safe place as these can give important clues while restoring the building.</td>
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<td>army occupation and is located adjoining the airstrip. The palace complex</td>
<td>There was no structural problem whatsoever and the building was well</td>
<td>It is strongly recommended that a comprehensive conservation plan for the building be prepared that focuses on its restoration and structural retrofitting.</td>
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<td>overlooks Betar river with mountainous territories in Pakistan occupied</td>
<td>maintained by the MES (Military Engineering Services) wing of the Army.</td>
<td>What is critical is the handling of the chimneys and gable walls for these need to be well supported, cross-braced and</td>
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<td>Kashmir (PoK) as a backdrop.</td>
<td>In the interior, there are hairline cracks everywhere in its interior,</td>
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<td>The first floor of the building has however badly been affected by the</td>
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<td>earthquake. There was a once again a</td>
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The palace was built in the early 20th Century and has a distinct colonial appearance because of chimneys, projecting windows over sloping roofs and lime plastered surfaces.

The main palace building is a two storey structure with
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<th><strong>three wings. Raised on a high plinth, there are steps at different positions to access the building. Both the floors comprise rooms with linear corridor running all along. It is essentially a load bearing construction, with thick walls in random rubble masonry lined externally with neatly dressed stones. Most walls have been plastered with lime.</strong></th>
<th><strong>clear demonstration of the weakness of various building elements like chimneys, dormer gable walls, as these were not well supported or cross-braced.</strong></th>
<th><strong>structurally strengthened.</strong></th>
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<td>As a result, chimneys at a few places collapsed and fell below thus triggering a collapse. One finds debris in form of stones, ornamental architectural elements, pieces of broken furniture, etc., lying all around. There have been damages to the sloping roof at a few places. Significant damages have occurred, however, towards the eastern wing, where a jharokha window had completely collapsed due to arch failure.</td>
<td>Portions that are completely collapsed need to be removed carefully. For major cracks, tell-tale signs need to be put in for monitoring movements, if any. At many places there are hairline cracks within plaster. Perhaps, plaster needs to be removed and redone completely. It is important to have a thorough structural investigation done of the fort to inspect if there is any overloading taking place anywhere. Such anomalies need to be removed.</td>
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<td>At many places, along the corridor at the upper level, plaster has completely fallen off like a large single piece which means it was already detached from the wall surface prior to earthquake.</td>
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### Sheesh Mahal, Poonch

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<td>Sheesh Mahal building, now housing Higher Secondary school for girls was built by the erstwhile ruler Raja Jagdev Singh. No dates for its construction are available, the building is clearly an early 20th Century structure with construction architectural style and construction techniques similar to Moti Mahal building.</td>
<td>The building prior to earthquake was in a fine condition. It has suffered serious damages due to earthquake and has been declared unsafe by the district authorities. The front circular projecting portion, originally marking the entrance, has detached from the main wall leaning outwards. One sees major cracks on either side along joints between the circular portion and the main front elevation. Externally, both the circular turrets towards the rear have collapsed. Also, the two offsets towards the rear have detached from the main wall surface and have leaned outwards.</td>
<td>Owing to the nature of destruction within Sheesh Mahal, it is important first to carefully remove the debris so that one can access portions of the building inaccessible at the moment. Care has to be taken that the historic material and details (carvings, etc.) be salvaged from the debris and kept carefully at a safe place as these can give important clues while restoring the building. Stone lying all around should be stacked safely as these can be reused while reconstructing the school building. It is strongly recommended that a comprehensive conservation plan for the building be prepared that...</td>
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<td>Field Assessment Report on Damages to Historic Properties in Jammu, Poonch and Riasi, Jammu and Kashmir</td>
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<td>It is a two storey building with an attic. Both the floors comprise rooms with linear corridor running all along the periphery of the building. It is essentially a load bearing construction, with thick walls in random rubble masonry lined externally with neatly dressed stones. Most walls have been plastered with cement. Several rooms have fire places and elaborate ceilings.</td>
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<td>Internally, while the ground floor is in a good condition, the first floor has suffered serious damages. The central wooden staircase has been the first casualty and it completely collapsed after stones from dormer walls came crashing down. It was difficult to climb the stairs as it was all filled with debris from above. Most rooms on the first floor have suffered serious damages very similar in nature to Moti Mahal. All chimneys and gable walls have completely collapsed inwards, i.e., into classrooms. As a result all the rooms have stones and wooden joists lying around. The sight was indeed gory and one shudders had there been girls around in those classrooms, there could have been a major disaster!</td>
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<td>focuses on its restoration and structural retrofitting. What is critical is the handling of the chimneys and gable walls for these need to be well supported, cross-braced and structurally strengthened. Portions that are completely collapsed need to be removed carefully. For major cracks, tell-tale signs need to be put in for monitoring movements, if any. At many places there are hairline cracks within plaster. Perhaps, plaster needs to be removed and redone completely. It is important to have a thorough structural investigation done of the fort to inspect if there is any overloading taking place anywhere. Such anomalies need to be removed.</td>
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thus weakening the arches thus causing wide spread damage.

Syndicate Building, Poonch

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<td>Syndicate Building, is primarily a three storey large building with commercial establishment on its ground level and residences on the two floors above. According to one of the tenants in this building, the whole residential portion has been occupied and divided between 15 families! It is a load bearing construction with bricks and timber as chief building material. The building from its appearance looks to be an early 20th Century construction.</td>
<td>The building prior to earthquake was in a reasonably fine condition. It has suffered serious damages due to earthquake and is unsafe for habitation. Here in this building, there is a little damage at the ground floor, i.e., in the shops. The first floor has been damaged partially and there are hairline cracks everywhere in the masonry and in the narrow staircase located centrally in the building. The second floor however has suffered maximum jolt.</td>
<td>Owing to the nature of destruction within the Syndicate building, it is important first to carefully remove the debris and store historic material, particularly bricks, and details, etc., at a safe place. These should be, if possible, reused while reconstructing the building. While reconstructing, it will be important to correct sections of floors and replace damaged timber elements, that actually triggered the collapse. A thorough retrofitting of the building is needed. Walls</td>
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Interesting about the building is its front elevation overlooking the main bazaar comprising pointed arches, a distinct colonial influence.

The front wall, with openings overlooking the street has completely collapsed thus exposing the inner linear verandah. There are structural cracks in several portions at this level.

Towards the rear, one of the portions has completely collapsed and portions of walls, wooden partitions and sloping roof are hanging precariously.

In fact this collapse has been triggered largely due to rotten timber elements within the building that had already weakened considerably at their ends and joints. Portions of the floor that were visible clearly showed the overloading by way of several additions to the floor slab. This overloading over weakened timber elements obviously could not sustain the jolt and therefore collapsed.

Tell-tale signs need to be supported, cross-braced and structurally strengthened. Tell-tale signs need to be put in for monitoring movements at a few places within the building, if any. At many places internally there are hairline cracks within plaster. Perhaps, plaster needs to be removed and redone completely.
**Geeta Bhawan Building, Poonch**

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<tr>
<td>No exact history available for the building, however it appears an early 20th Century construction. Originally believed to be a haveli it is now being used as a school.</td>
<td>The building prior to earthquake was in a reasonably fine condition. It has suffered serious damages due to earthquake and is now unsafe for habitation.</td>
<td>Owing to the nature of destruction within Geeta Bhawan building, it is important first to carefully remove the debris, store historic material at a safe place. These should be, if possible, reused while reconstructing the building.</td>
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<td>L-shaped in plan, a two storey structure, load bearing construction with bricks and timber as chief building material.</td>
<td>It was difficult to access most parts of the building as debris fallen from above had completed locked the solitary staircase (something that should be looked into carefully while designing!)</td>
<td>While reconstructing, it will be important to correct sections of floors and replace damaged timber elements, that actually triggered the collapse.</td>
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<td>The building still has surviving original features like jhaorkhas, however, there have been major intervention in the recent past. Walls have been plastered with cement. A floor has been added above perhaps to accommodate more classrooms.</td>
<td>Ground floor remains largely intact while the first floor offers reminiscence of severe jolts. There are cracks everywhere in walls, masonry ripped apart at places, gaping holes in floors, and arches, in bricks, have failed</td>
<td>A thorough retrofitting of the building is needed. Walls need to be supported, cross-braced and structurally strengthened.</td>
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<td>Tell-tale signs need to be put in for monitoring movements at a few places</td>
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External wall and portions of floor in the eastern portion of the building has collapsed completely due to weakened timber members of the floor. From the debris lying all around, one could see wooden joists and floor boards eaten up by termites.

Damages have also occurred due to the overloading of the structure. The additional floor added over has collapsed completely on the structure underneath thus causing damages at the first floor level.

There are bulges in walls at several places, at a few places, masonry has been ripped apart. The masonry in the *dhajji dewari* construction in the northern and southern faces are however completely intact.

At many places internally there are cracks within plaster. Perhaps, plaster needs to be removed and redone completely.
Government City Middle School, Poonch

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<tr>
<td>No exact history available for the building, however it appears an early 20th Century construction as well.</td>
<td>The school building has suffered serious damages due to earthquake and is now unsafe for habitation. Portions of walls have collapsed completely into the classroom in one of the wings. Complete collapses have also occurred in other parts of the school building. The floor of another portions of the building (with the jharokha in front) has collapsed but that’s largely due to the overgrown vegetation. Cracks can be seen at places where wall plate has shifted because of lateral</td>
<td>Owing to the nature of destruction within the school building, it is important first to carefully remove the debris, store historic material at a safe place. These should be, if possible, reused while reconstructing the building. A thorough retrofitting of the building is needed. Walls need to be supported, cross-braced and structurally strengthened. Tell-tale signs need to be put in for monitoring movements at a few places within the building. At many places internally</td>
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Field Assessment Report on Damages to Historic Properties in Jammu, Poonch and Riasi, Jammu and Kashmir

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<tr>
<td>This is one of the oldest residential building in Poonch town. Its current owners maintain that the it is more than hundred years old. There are two portions in the haveli with a courtyard in the middle. It is a single storey structure. Old portions are the building have load bearing construction system and old Lakhori brick has been used.</td>
<td>It is however in parts of the building that the damage can be seen. Roofs have collapsed at a couple of places and that's largely because of timber beams with rotten edges because of water penetration and termite attack. There are serious structural failures in the northern and southern parts of the buildings. Many arches have failed in the crown.</td>
<td>A thorough retrofitting of the building is needed. Walls need to be supported, cross-braced and structurally strengthened. Roofs have to be redone using same materials. Structural retrofitting is required.</td>
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Haveli Mian Gulab Singh, Poonch

December 2005 39 AH Division, INTACH, New Delhi
Jama Masjid, Poonch

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<td>The only new building that the team visited to look at the failures.</td>
<td>The building still survives but has suffered serious damages due to the earthquake thus raising questions over precautions taken while doing structural design of such a building.</td>
<td>A thorough retrofitting of the building is needed. It is important to take advice from a qualified structural engineer to design the retrofitting.</td>
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<tr>
<td>It is a three storey structure located in the middle of the bazaar. The ground level primarily has storage spaces, while the main congregation takes place at the first floor.</td>
<td>The building was mentioned having swayed menacingly as it stands in isolation. One finds structural cracks in several parts of the building. Cracks are largely located along the north and south walls.</td>
<td>The dome needs to be lifted by mechanical means, the crushed masonry removed and redone but structural strengthening is required by means adding short columns.</td>
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<td>Designed by a local engineer, it is a RCC frame structure, and walls made of 9” and 4 1/2 “ thick brick walls.</td>
<td>The RCC dome has shifted by several inches, has slid from the beam and is resting over the RCC slab after crushing the masonry band between dome and ring beam. This has happened because the</td>
<td>Broken walls need to be supported, and re-laid. Roofs have to be redone using same materials.</td>
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<td>The building was still under construction and finish work was already underway on the upper floors. The only feature of interest is its large RCC dome located in the middle of the terrace</td>
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and supported over a concrete ring beam and a masonry band with openings.

masonry was weak enough to not to sustain the jolt and it completely got crushed once there was lateral movement in the dome.

There are horizontal cracks in the southern minaret indicating perhaps a slight shift in masonry due to the presence of weakened mortar.

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<td>Bagh Deodi marks the entrance to Poonch town and is a 19th Century structure. It is a two storey structure with a large arched opening in between and rooms on either side. The gateway features interesting ornamental</td>
<td>The building is in a reasonably fine condition and is not much damaged in the earthquake. There is a large structural crack emanating from the roof till the crown of the arch. There are cracks at several places on the cornice in the central portion.</td>
<td>A thorough retrofitting of the building is needed. The arch and the crack needs to be repaired and stitched. There are also problems in the masonry because of vegetative growth. Vegetation needs to be removed and roots already</td>
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<td>elements like jharokhas and mythological images in stucco, for instance, Ganesha with his consort flanked by a rat and a swan over the gateway. Another niche houses images of Lord Shiva and his consort.</td>
<td>penetrated within the structure need to be killed.</td>
<td>It is a load bearing structure with stone plinth and lakhori brick thick walls. One could not approach its interior as it was locked at the time of the visit. The central portion is covered with CGI sheets supported by steel truss.</td>
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MORE IMAGES FROM POONCH

Fig. 19 a and b: Complete collapse towards the rear portion of Poonch Fort. The failed portion is that of a new structure built atop the old one.

Fig. 20: Another view of the collapsed portion in Poonch fort
Fig. 19: Damaged wall of the Poonch Fort

Fig. 20: Portion of the bastion collapsed towards the rear of the Fort. Damage also accentuated by the weakness already due to the growing *Pepul* tree and its deep roots

Fig. 21: Collapsed reading room towards the rear of Poonch Fort
Fig. 21: Damaged wall of the Poonch Fort

Fig. 22: Damaged interior of the Poonch Fort

Fig. 23: A small opening within the fort. The masonry has completely detached from the base.
Fig. 24: Collapsed library portion of Poonch Fort. Collapse was caused by weak end joint of wooden joists and overloading of floor.

Fig. 25: Complete detachment of the roof from the wall. Also can be seen is the wide structural crack detaching walls.

Fig. 26: Corner of a building within Poonch fort. Corners are not braced and at the top-most level (at base of the sloping roof) have failed.
Fig. 27: RCC beam detached and fallen in one of the portions in Poonch fort. This was the new addition to the fort towards its rear.

Fig. 28: Complete collapse of the roof. Slab has come down like a thick large sheet perhaps because of weak walls.
Fig. 29: The collapse of the rear portion is also due to completely rotten wooden members as seen in this image

Fig. 30: Damaged reading room within Poonch fort
Fig. 31: Broken chimney in Moti Mahal. All the chimneys collapsed within Moti Mahal causing wide spread damage

Fig. 32: Detached and sagged flooring of a toilet at the first floor level
Fig. 33: Most partition walls within Moti Mahal have collapsed as these were standing in isolation with no fixing or anchorage

Fig. 34: Stones from collapsed gable walls lying in one of rooms at the first floor level of Moti Mahal
Fig. 35: Collapsed gable walls in Moti Mahal. Most gables collapsed as these were standing as independent walls without any support or bracing.

Fig. 36: Collapsed chimney in Moti Mahal. The big gaping hole has been covered with plastic sheet to prevent any rain ingress.
Fig. 37: Northern part of Sheesh Mahal badly affected. Image of the corridor shows failed arches, stones fallen from the roof, structural cracks in walls.

Fig. 38: Wide structural crack at the corner in stone masonry in Sheesh Mahal. Also can clearly be seen is the bulge in the wall.

Fig. 39: Collapsed gables in Sheesh Mahal.

Fig. 40: Roof collapse in classrooms in Sheesh Mahal.
Fig. 41: Another image of gable collapse in Sheesh Mahal. The thick masonry wall in between class rooms has also fallen off. Damages can also be seen to the roof and ceiling

Fig. 42: Typical arch failure with key stone being dislodged in Sheesh Mahal
Fig. 43: Collapse of staircase blocking the circulation, Sheesh Mahal

Fig. 44: Collapsed turret in Sheesh Mahal; both turrets towards the rear have collapsed

Fig. 45: A small off-set within wall completely detached from the main wall thus leaning out precariously
Fig. 47: Failure of arches on the first floor level in Sheesh Mahal

Fig. 48: Top portion of the front central bay of the building collapsed. The collapse is of the dressed stone exposing the random rubble underneath

Fig. 49: Temporary classrooms in tents in Sheesh Mahal school
Fig. 50: Failure of masonry above bay window in Baldev Mahal, Poonch

Fig. 51: Collapsed gables in Baldev Mahal, Poonch

Fig. 52: Complete failure of the arched opening, Baldev Mahal
Fig. 53: Broken chimney atop Baldev Mahal

Fig. 54: Roof collapse of another structure within Baldev Mahal palace complex. The roof collapsed due to weak joints between wooden joists and walls.
Fig. 55: Large concrete dome of the local Jami mosque shifted from its base

Fig. 56: Major structural cracks in niches in walls
Field Assessment Report on Damages to Historic Properties in Jammu, Poonch and Riasi, Jammu and Kashmir

Fig. 57: Complete collapse of the rear portion of Syndicate building, Poonch

Fig. 58: Front wall of Syndicate building collapsed due to lack of support or adequate bonding with floor or wall plate

Fig. 59: Rear portion of Syndicate building completely collapsed due to weakened timber elements in floor as well as over-loading
Fig. 60: Local house with Dhajji Dewari construction system in Poonch damaged. While timber elements remain in position, infill brick panels have come out.

Fig. 61: General scenes of destruction in Poonch city. Damages have occurred largely at the upper levels mainly because of poor joinery details of timber elements and lack of adequate bracing of walls.
Fig. 62: A local house tilting precariously after the earthquake. This condition is largely due to weak timber joints.

Fig. 63: Girls' School in Poonch where portions have collapsed due to arch failure.

Fig. 64: Girls' School in Poonch - load bearing masonry wall completely collapsed because of lack of any support or bracing.
Field Assessment Report on Damages to Historic Properties in Jammu, Poonch and Riasi, Jammu and Kashmir

Fig. 65: Wide structural cracks and plaster peel off in Geeta Bhawan School

Fig. 66: Arch failure inside Geeta Bhawan School building
Riasi

Riasi is a small town close to Katra, approximately 65 kilometres, or two hours from Jammu. The team reached Riasi after a day’s tiring journey. The mandate was to look at only the Bhimgarh fort which had suffered damages. Once again, our enquiries revealed that there were no damages due to earthquake reported from Riasi. 2 sites were visited in Riasi to assess damages.

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<td>The fort is essentially a mid-19th Century structure perching on a local hill. The fort therefore owing to its location commands an excellent panoramic view of the town underneath with hills in the backdrop.</td>
<td>Major damage has occurred to the free standing fort wall, above the retaining walls. Severe vertical cracks have occurred at places where building materials are not matching. The structure had already been weakened by excessive vegetative growth. The two important bastions at southern and northern western sides have suffered major damages. Bastions at Southern and north-western sides have</td>
<td>It is strongly recommended that a comprehensive conservation plan for the building be prepared that focuses on its restoration and structural retrofitting. It is important first to carefully remove the debris so that one can access portions of the fort complex inaccessible at the moment. Stone lying all around should be stacked safely as these can be reused while reconstructing the fort bastions.</td>
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<td>The fort is a protected monument, protected by the State Department of Archaeology.</td>
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<td>Located atop a hill in the midst of Reasi town, the Qila has no defined geometric form. There are</td>
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four major bastions protruding at corners of the fort. All around the fort wall, one can observe a series of slim octagonal abutments to strengthen it. Within the confines of the fort wall, there are a number of structures like temples, water reservoir (*baoli*) and a newly constructed municipal water storage tank.

The thick rampart wall is constructed in stone masonry and laid in rich lime mortar. The walls above free standing walls are in brick facing with inner core in random rubble masonry.

All recent repair works have been done in brick work, not going with the original material either structurally or aesthetically. The height of the northern wall has also been increased for no specific reason; this has been done in brick work.

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<th>partially fallen.</th>
<th>Major cracks occurred to portions that are free standing in brick masonry.</th>
<th>For major cracks, tell-tale signs need to be put in for monitoring movements, if any.</th>
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<td>Fort wall suffering from severe vertical cracks.</td>
<td>Portion above the main northern entrance <em>deodi</em> is bulging.</td>
<td>It is important to have a thorough structural investigation done of the fort to inspect if there is any overloading taking place anywhere. Such anomalies need to be removed.</td>
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### Zorawar Fort, Riasi

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<td>The remains of Zorawar fort, now only a small two structure, overlooks Chenab river. A family living near the fort claims itself to be the descendent of the legendary General Zorawar Singh and attributes the fort to be built by him. They are the current custodians of this fort. The fort is unprotected.</td>
<td>The building even prior to earthquake was in a deteriorated state owing to material failure and lack of maintenance. Roofs had collapsed in the southern portion; wooden joist and planks had completely rotten at edges making surviving floors extremely vulnerable. There are two vertical structural cracks elevationally separating the three bays from each other. Earthquake has not added much to the damage, but has augmented cracks at several places. Consequently walls have detached from each other at corners, a portion of floor towards western side has collapsed and parts of structure, including roof are hanging precariously.</td>
<td>It is strongly recommended that a comprehensive conservation plan for the building be prepared that focuses on its restoration and structural retrofitting. For major cracks, tell-tale signs need to be put in for monitoring movements, if any.</td>
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It is a load bearing construction in brick masonry, while at several places unbaked bricks have
also been used. The roof is flat, made of lime concrete supported over wooden joists. In terms of decorative elements only brick columns plastered in lime are worth any notice.
MORE IMAGES

Fig. 67: Image of Riasi fort prior to earthquake (image courtesy SDM, Riasi)

Fig. 68: Collapsed turrets of Bhimgarh fort
Fig. 69 and 70: Collapsed external walls in Bhimgarh fort. Figure 70 indicates a free standing brick facing wall with soft masonry core. The brick facing has collapsed on either side thus exposing the core masonry.

Fig. 71: Bulges in wall and arch failure. Cracks are travelling vertically from arched opening above to the cusped arch below.
Field Assessment Report on Damages to Historic Properties in Jammu, Poonch and Riasi, Jammu and Kashmir

Fig. 72: Weak timber joists and wooden plank ceiling weakened after termite attack in Zorawar Singh Fort

Fig. 73: Southern portion of Zorawar Singh fort collapsed after the earthquake. While external façade has brick finish, its inner core comprises mud bricks
Summary of Observations

The visit highlighted a range of points and issues and a brief of these is as given below:

- The earthquake was severe and while it caused immense damages in Pakistan-Occupied-Kashmir, the impact on border districts of Jammu, Poonch and Riasi in Kashmir was relatively less.

- Poonch has suffered extensive damages due to earthquake. Damages to new construction (RCC frame and brick in-fill) was relatively less in Poonch than buildings constructed in Taq (load bearing system of thick stone masonry walls) or Dhajji Dewari (timber frame or armature with brick infill) style of construction. Most historical or old buildings in Poonch employ either or a combination of these two systems of construction. There have been no reports from Jammu on losses in new constructions. It was only the Mubarak Mandi complex that has suffered extensive damages in selected portions. Similarly in Riasi no damages were reported to the new construction and only the Bhimgarh fort atop the local hill suffered damages.

- Damages to historic structures like Moti Mahal and Sheesh Mahal in Poonch have occurred largely due to the rigidity of their structural system. Both these buildings seemingly in a very good condition prior to the earthquake behaved badly against the lateral forces of earthquake as there was no bracing of gable walls and chimneys. Gable walls were standing in isolation and without any support and were acting merely as partition walls dividing roof space, hence, the jolt easily brought them down. Similarly there was not support to the chimneys that also suffered a similar fate.

- Faulty design has also been an attribute to the failure of structures. This was noticeable more so in Sheesh Mahal where all offsets came off the main walls towards its rear portion. This was largely due to the lack of any tying element between the offsetting and the main walls.

- Damages to Tak system was more visible than the Dhajji Dewari system. This was apparent in a number of old or historical buildings in Poonch. It was surprising indeed to realise that most Tak based constructions, like Moti Mahal or Sheesh Mahal, in Poonch, didn’t have any precautions against earthquake. Traditionally a timber band after every few courses of stone would run all along the wall surface providing both inherent strength as well as resilience to withstand any lateral movement. In both these cases, easily considered to be the
one of the finest examples of palace architecture in Poonch region, such a precaution was missing!

- Almost everywhere, damages were noticed more on the first or the subsequent floors while the ground floor was relatively intact. Ground floors, because of their firm anchorage with the ground, experienced less sway than the upper floors, hence the reason.

- It was experienced in several instances that circular building elements like turrets and circular staircase behaved badly and nearly all of them collapsed. This was noticed in Sheesh Mahal in Poonch and Bhimgarh fort at Riasi. Similarly arches have also behaved badly in all cases and have failed. Failure of the arch is due to the failure of keystone that comes out and rest of the arch simply collapses. Such failures have repeatedly been witnessed in other instances of earthquakes as well, for instance the Gujarat earthquake in the year 2001.

- Even though one can attribute damages to historic structures to earthquake, there are, however, a number of other factors that are equally contributory to the destruction. It may therefore not be too erroneous to say that the earthquake acted as a catalyst for such a wide spread damage. It was observed in a number of instances that the structural members, in particular, timber elements had already gone weak because of their age, continuous moisture penetration, dry rot or termite attack. In most timber elements it was the weak joint (with the wall in case of a joist) or a failed wall plate that accentuated the destruction. In several cases overloading became a factor for damages or collapses. In Poonch fort and Geeta Bhawan school building addition of a floor above over already over-loaded structure caused widespread damages. Other instances of failure were also due to the vegetative growth on structures with their roots penetrating deep thus weakening the building fabric. Lack of periodic maintenance in most instances can also be a factor contributing to the damage.

- Even though beyond the scope of INTACH’s objective of the visit, a few recent constructions were also looked into to understand their patterns of failure. Two major aspects were noticed that contributed to the damage. These modern buildings highlighted that the poor quality of materials, their incorrect proportions and faulty structural designs contributed to their damage. For instance, in Jami Masjid in Poonch, the failure of the dome and its minaret, diagonal or vertical cracks in walls suggest a poor quality of construction.
Post Script

A number of lessons can be learnt from the earthquake. Earthquakes are grim but important pointers that show us mistakes being continually made by us. It is sad that we have continued to make such mistakes ignoring warnings from previous earthquakes or learning from others’ mistakes.

While the team was touring in the border districts of Jammu and Kashmir, it was heartening to see life bouncing back, people rehabilitating themselves, state and local government and public-private initiatives taking a pro-active role in returning life to normalcy. The affected people had already accepted the earthquake as their fate and had moved on. Stones were stacked neatly in streets, homes cleared of debris. People albeit living in tents were happy and busy rehabilitating themselves by combining their personal resources with financial aid provided by state/local government. Only broken walls or roofs or remains of old buildings were in fact the physical reminders of the jolt.

It is sad to realise that historical buildings become wanton victims after the earthquake as people use post-earthquake scenario as an opportunity to get rid of them and replace them with inappropriate constructions. This even happens when a historical building has suffered minor damages and is still ‘safe’ indeed. This highlights a glaring apathy towards historical buildings, the physical reminders of our glorious past. Historical buildings in the affected areas of Jammu and Kashmir have suffered damages in the earthquake perhaps not only because they were old but because of many other reasons like faulty construction, inherent weakness of materials, little or no maintenance, bad detailing, etc. Most historical buildings, contrary to the popular belief, can be saved and returned to an early known state, provided there is will and support in such belief.

It is a matter of surprise or concern that there is not much literature or information available on how to look after a historical building should an earthquake strike a place. Ample research has been conducted at various levels by government, by various institutions and organisations still there is little information available on basic do’s and don’ts on what to do once the earthquake strikes. Such information should always be with the district administration with the concerned departments as a ready reference. The earthquake therefore throws open a challenge for all concerned professionals like conservation architects, architects, structural engineers, civil engineers, et al, and there is tremendous scope of research into not only repairs or restoration but retro-fitting of historical buildings.

Organisations like INTACH indeed have a pro-active role to play. Their involvement ranges from providing technical interventions to ‘educate’ or inform the local community...
directly or indirectly involved with historical buildings. A vital lesson to be learnt here is also to have technical studies conducted of existing and surviving historical buildings in the earthquake-sensitive regions of the country, by expert conservation architects, structural engineers, seismologists, etc., to apprise their structural integrity vis-à-vis any impending earthquake of a high intensity. Studies conducted in advance may allow us timely intervention and prevent disasters of the scale we have been witnessing of late. As Sir Bernard Feilden very appropriately remarks, "We are always living between two earthquakes"!

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