

II-2 Building Inventory

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INTRODUCTION

There does not exist any significant database on the buildings in Kathmandu Valley. Partial databases have been prepared by individual institutions such as the one prepared by the Department of Urban Development and Building Construction, and the other by the Nepal Telecommunication Corporation. But these databases do not contain building information in sufficient details to make any conclusion on the building typologies and structural vulnerability. A limited effort was done by the Building Code development Project (BCDP 1994) on studying the building typologies existing in Nepal. It included some information on Kathmandu. But it is very preliminary, and the conclusions are subjective. However, the Kathmandu Valley Earthquake Risk Management Project (KVERMP), implemented by the National Society for Earthquake Technology Nepal (NSET-Nepal) used the limited information to come up with a scenario of potential damage to buildings in the Valley, and demonstrated the need to undertake a systematic inventory of existing buildings to arrive at conclusions on the vulnerability of the existing buildings to strong earthquakes.

The building inventory aimed mainly to provide the necessary basis towards fulfilling the larger objectives of the Project towards formulating a plan for earthquake disaster mitigation in Kathmandu Valley and to create a database on earthquakes and a prediction system on earthquake disaster.

The immediate objective of the Building Inventory component was to collect pertinent information on representative building typologies in select representative areas of Kathmandu Valley for the evaluation of the weaknesses of the prevalent buildings types.

The inventory was conducted for a total of 1183 buildings under various usages both from urban and rural areas. Of the samples from urban areas, 150 belonged to commercial buildings, 40 to industrial buildings, 32 institutional buildings and 500 to residential ones. The samples in rural environment were mainly residential buildings and constituted to a total of 461 buildings.

It is considered that the sample represents the overall building conditions in the Kathmandu Valley.

METHODOLOGY

The methodology adopted for the conduction of the Building Inventory consisted of several tasks that are described briefly in the following sub-sections.

Survey Format Design and Generation

The building inventory started with the design of a survey format for use during the building inventory survey. The format required recording response to some questions from the house-owner, and also recording certain data to be obtained from visual survey and tape measurements. The format consisted of 3 parts, notably A) General Information, B) Building Details, and C) Retrofit Details.

Part A: General Information:

- 1) Information on House-owner
- 2) Location and address
- 3) Settlement Type
- 4) Effects of previous earthquake/flood events, and
- 5) Process of building construction

Part B: Building Details:

- 1) Construction date & registration
- 2) Current use
- 3) Information on design and supervision
- 4) Existence of open space surrounding the buildings
- 5) Information on occupancy
- 6) Geometry (plan, area, information on door / windows, structural elements etc)
- 7) Site conditions (terrain type, building position with respect to adjacent buildings, potential local hazards)
- 8) Shape of buildings in plan & elevation, configuration problems,
- 9) Information on foundation, construction materials, details on walling materials and section, information on roof and floors
- 10) Presence of seismic-resistant features such as lintels, wall plate, roof band, corner bars, through stones
- 11) Defects in the buildings

Part C: Retrofit Details:

- 1) Used method of retrofitting, if any

The inventory form also included information on the surveyor, contact address, and the dates of survey.

After the design, the survey format was subject to review by experts from Japan. A sample of the building inventory form is attached as Annex.

Conduction of the Survey

NSET-Nepal entered into agreements with Nepal Engineering College (Pokhara University), Kantipur Engineering College (Tribhuvan University) and Kathmandu Engineering College (Tribhuvan University) for engaging the senior students of their Civil Engineering and Architecture programs in the building

inventory survey process. This was done with the intention of technology transfer to the young generation. The student-surveyors were provided training on the skills of interview and visual inspection based on the Building Survey Forms.

The training consisted on one-day explanation of the purpose and importance of the survey, effects of earthquake on buildings, the questionnaire details, methods of measurements and drawing/sketch preparation, approach as well as methods for interview and how to deal with any difficult situation during the survey.

The one-day classroom training was followed by another one-day field-testing when all the surveyors conducted sample survey of buildings. The results of their surveys were analyzed in group to make sure that the surveyors were confident of the survey methods.

The training to the surveyors was administered by Survey Supervisors. The Survey Supervisors were professional engineers. There was one Survey Supervisor for every ten Surveyors. The Supervisor visited the survey areas to monitor the survey process and also to check the survey data during the survey itself.

The forms filled up during the field-testing were for the purpose of training only and have not been included in the final survey.

The Survey Areas

The building inventory survey covered both the urban and rural settlements of Kathmandu Valley. It also covered the commercial and the industrial (light industry) areas. The latter are located mainly within or in the outer fringe of the municipal areas.

The following table provides the different types of survey areas covered by the Building Inventory.

Selection of sample locations

Extensive field reconnaissance was undertaken in the three districts of the Kathmandu Valley to understand the distribution of the building typologies, settlement patterns, and their numbers in both the municipal and VDC areas to select representative survey areas.

Selection of buildings in the survey areas

The survey areas were visited by the supervisors and the surveyors jointly to understand the building typologies, number of stories, and the use. Selection of individual buildings as survey samples was guided by the above consideration although the selection of the sample building itself was on a random basis.

RESULTS OF THE BUILDING INVENTORY

Overview of the Target Buildings

The following Table presents the location and name of the survey areas (settlements), the number of buildings in each of the survey areas, and the usage of the buildings surveyed.

District	Settle	VDC/Municip	Areas	Name of Place	No of Building	No.	Geomorphology	River		
Kathmandu	Rural	Alapot	1west	Alapot	27	1-27	1	Terrace IV, Terrace II	B-M	
		Talkududochour	1west	Talkududochour	26	28-53	2	Talus, Godavari	W-B	
		Dharmasthali	1west	Dharmasthali	26	54-81	3	Terrace IV	W-B	
		Machhagaoun	1west	Machhagaoun	26	82-109	4	Talus, Chandragiri	W-B	
		Sankhu	1east	Sankhu	26	110-135	5	Talus	B-M	
		Bishnu Buchhari	1east	Bishnu Budhanikantha	23	136-158	6	Shaopuri	B-D	
		Gongabu	1west	Gongabu	21	159-179	7	Terrace II (Recent river)	B-D	
		Jorpati	1east	Jorpati	21	180-200	8	Recent river	D-B	
		Sitapala	1west	Sitapala	24	201-224	9	Terrace II (Recent river)	W-B	
		Thankot	1west	Thankot	24	225-248	10	Talus	W-B	
		Urban	Kathmandu Metropolitan City	Core	Chokhanche Gully (Ward # 25 & 26)	21	249-269	11	Terrace II	B-D
					Om Bahal, Kotachi (Ward # 23)	18	270-287	12	Terrace II	B-D
	Ward No # 20 (Kasthamandap, Bhimsenthan)				18	288-305	13	Terrace II	B-D	
	Ason (Kamalachi to Jana Bahal) (Ward #27 & 30)				18	306-323	14	Terrace II	B-D	
	Jwabahal (Ward # 27)				21	324-344	15	Terrace II	B-D	
	Buddha Nagar (Ward # 10)				17	345-361	16	Terrace I (Recent river)	D-B	
	Kirtipur Municipality		Fringe	Mitri Marga (Ward # 34)	18	362-379	17	Terrace II	D-B	
				Sorakhutte (Ward # 18)	18	380-397	18	Recent river	B-D	
				Kuleshwar (Ward # 14)	18	398-415	19	Terrace II, Terrace I	W-B	
				Layaku (ward#5,6)	12	416-427	20	Tistung	W-B	
				Naya Bazar (Ward # 3)	12	428-439	21	Terrace II, Tistung	W-B	
				Chilanchi Bihar	12	440-451	22	Tistung	W-B	
	Fringe	Panga	12	452-463	23	Talus	W-B			
		Nagaun	14	464-477	24	Terrace II	W-B			
Bhajangal		14	478-491	25	Sopyang	W-B				
Chobhar		14	492-505	26	Chandragiri	W-B				
Khokana		26	506-533	27	Talus	S-H				
Lale		26	534-569	28	Talus	S-H				
Lalitpur	Rural	Godawari	21	580-580	29	Talus, Terrace V	S-H			
		Lubhu	20	581-600	30	Terrace IV (Recent river)	S-H			
		Sunakothi	20	601-620	31	Terrace IV	S-H			
		Chyasa, Durbar Square	12	621-632	32	Terrace II	S-H			
		Nagbahal	10	633-642	33	Terrace II	S-H			
	Urban	Lalitpur Sub-Metropolitan City	Core	Nakbahal to Golden Temple (Right Side)	12	643-654	34	Terrace II	S-H	
				Gobahal (Nabahal)	12	655-666	35	Terrace II	S-H	
				Sai Dobato	12	667-678	36	Terrace II	S-H	
				Ekanta Kuna	12	679-690	37	Terrace III, Terrace II	S-H	
				Sanepa	13	691-703	38	Terrace II	S-H	
				Tutepani	12	704-715	39	Terrace II, Terracell	S-H	
				Fringe	Gundok	21	716-736	40	Terrace IV (Recent river)	S-H
Nagarokot	27	737-763	41		Kulshari	M-H				
Nangkhel	27	764-790	42		Terrace III (Recent river)	S-H				
Duwakot	23	791-813	43		Terrace IV	M-H				
Datta Treya Square Area	14	814-827	44		Terrace III	S-H				
SukulDhoka, Taumadhi	12	828-839	45		Terrace III	S-H				
Guhya Pokhari	12	840-851	46		Terrace III	S-H				
Bhaktapur	Rural	Surya Binayak	12	852-863	47	Talus, Terrace IV	S-H			
		Kamal Binayak (Land Pooling Area)	13	864-876	48	Terrace III	S-H			
		Mahakali Ward # 10	12	877-888	49	Recent river	M-H			
		Thimi Ward # 14 (Tachchu Tole)	12	889-900	50	Recent river, Terrace III	M-H			
		Dui Pokhari, Thimi	13	901-913	51	Terrace III	M-H			
	Urban	Bhaktapur Municipality	Core	Nagadeesh, Bode	12	914-925	52	Terrace III	M-H	
				Gatthaghar	12	926-937	53	Terrace II	M-H	
				Near Sella Ghari (Madhyapur Municipality Side)	12	938-949	54	Recent river	S-H	
				Between Ward # 1 and 2	12	950-961	55	Terrace III (Recent river)	M-H	
				Balaju Industrial District	9	962-970	56	Terrace II (Recent river)	W-B	
				Retan Industrial District	10	971-980	57	Terrace III	S-H	
				Bhaktapur Industrial	11	981-991	58	Terrace III (Recent river)	S-H	
Kathmandu Valley	Industrial	Urban	Madhyapur Industrial Lane (Aranki Highway)	10	992-1001	59	Recent river	M-H		
			C-1	Lanchour -Lazimpat-Maharajganj	26	1002-1027	60	Terrace II	B-D	
			C-2	Old Baneshwar-Maitidevi-Dillibazar-Baghbazar-Ratnapur	26	1028-1083	61	Terrace II (Recent river)	B-D	
			C-3	Old Baneshwar-Gaushala-Chahal-Baudha	25	1054-1078	62	Terrace III	D-B	
			C-4	Thapathali-Patalisadak-Kamaladi-Kingsway-Kartipath-J	25	1079-1103	63	Terrace II	B-D	
	Commercial	C-5	Indrachowk-Newroad-Bhotabahal-Teku-Kalmali-Kalanki	26	1104-1129	64	Terrace II	B-D		
		C-6	Saldobato-Lagnkhel-Jawalakhal-Pulchowk-Kupondole	22	1130-1151	65	Terrace III	S-H		
		Institutional	Hospital	8	1152-1159	66				
			College	10	1160-1189	67				
			School	10	1170-1179	68				
	Cinema Hall	4	1180-1183	69						

Note:

- 1) Urban core is defined as the old historic settlements around which the present cities of Kathmandu, Lalitpur and Bhaktapur grew. These are compact and very dense settlement areas.
- 2) Urban fringe is all the settlement areas within the present boundaries of the municipalities excepting the urban core areas.
- 3) Suburban areas are defined as the Village development Committees (VDC) adjacent to the municipal boundaries. These are rapidly urbanizing areas that are covered mostly by centrally administered urban infrastructure and services such as water supply, telephone, electricity etc.
- 4) Suburban core is defined as compact and very dense old historic settlements in the Suburban VDCs.
- 5) Suburban Fringe is defined as all the suburban VDC settlements excepting the Suburban Core.
- 6) Rural areas are defined as all the VDCs other than Suburban VDCs.
- 7) Rural Core are the dense and compact settlement, many are very old settlements with traditional architecture.
- 8) Rural Fringe is defined as all the rural settlements excepting the rural core areas.

Building Typology and Classification

The buildings of Kathmandu Valley are of the following types, as indicated by the building inventory survey.

Definition of building typologies in Kathmandu Valley

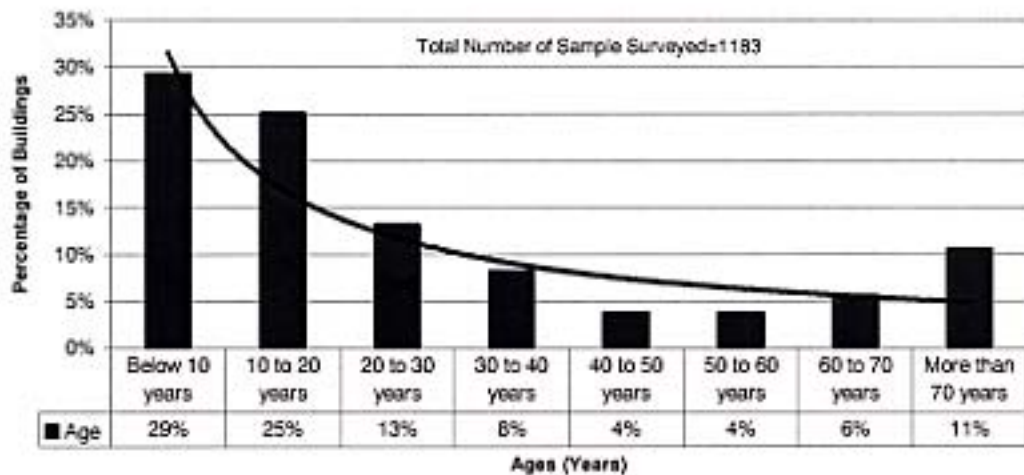
No.	Building Type	Description	Percentage (%)
1	Adobe:	These are building constructed using sun-dried bricks (earthen) with mud mortar for the construction of the structural walls. The walls are usually more than 350 mm.	19
2	Stone:	These are stone-masonry buildings constructed using dressed or undressed stones. All the surveyed buildings of this typology have used mud as the mortar.	7
3	Brick in Mud:	These are the brick masonry buildings with fired bricks in mud mortar. In urban areas, the buildings with adobe inside and an outer layer of fired brick were taken as brick in mud.	18
4	Brick in Cement	These are the brick masonry buildings with fired bricks in cement or lime mortar. All the surveyed buildings of this typology have used cement as the mortar.	21
5	Reinforced Concrete Frame	These are the buildings with reinforced concrete frame with unreinforced brick masonry infill with cement sand mortar in general. In most of the cases The thickness of the wall is 230mm(9") and column size is predominantly 9"*9".	23
6	Others	Mixed buildings like Stone and Adobe, Stone and Brick in Mud, Brick in Mud and Brick in cement etc. are other building type in Kathmandu valley.	12

Age of Buildings

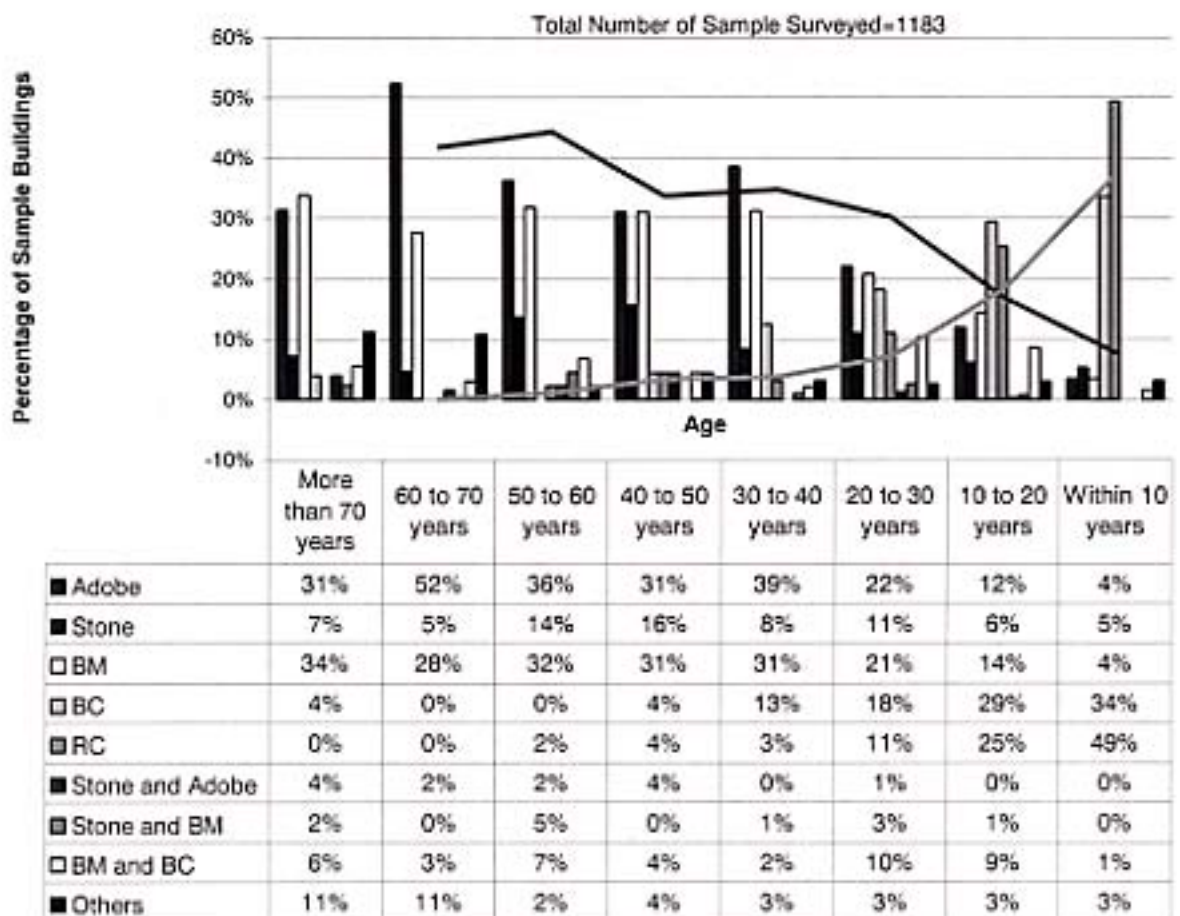
More than half of the existing buildings in Kathmandu Valley are less than 20 years old, while about a third of them are less than 10 years old. This fact shows the rapid urbanization process in the Valley. However, about 21% of the total buildings are more than 50 years old indicating to a high vulnerability, especially if one considers that the predominant type of older buildings, both in urban and

rural areas, is either adobe or brick/stone masonry in mud mortar.

From the above chart it is seen that, a significant growth in brick-in-cement and RC frame constructions started only 20 and ten years ago respectively. During these years, the proportions of adobe and brick-in-mud buildings are on a significant decrease



Age of the Kathmandu Valley Buildings

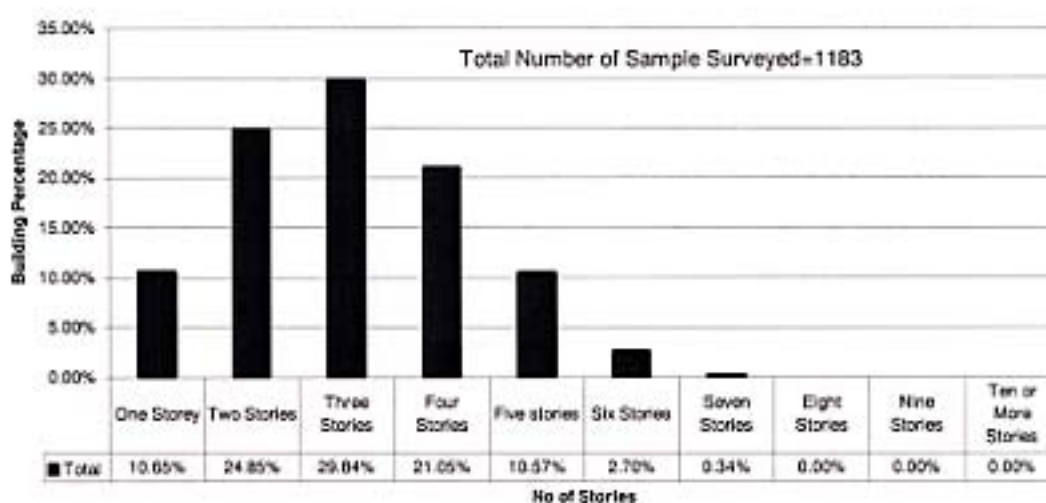


Relation of Age and Building Typology in Kathmandu Valley

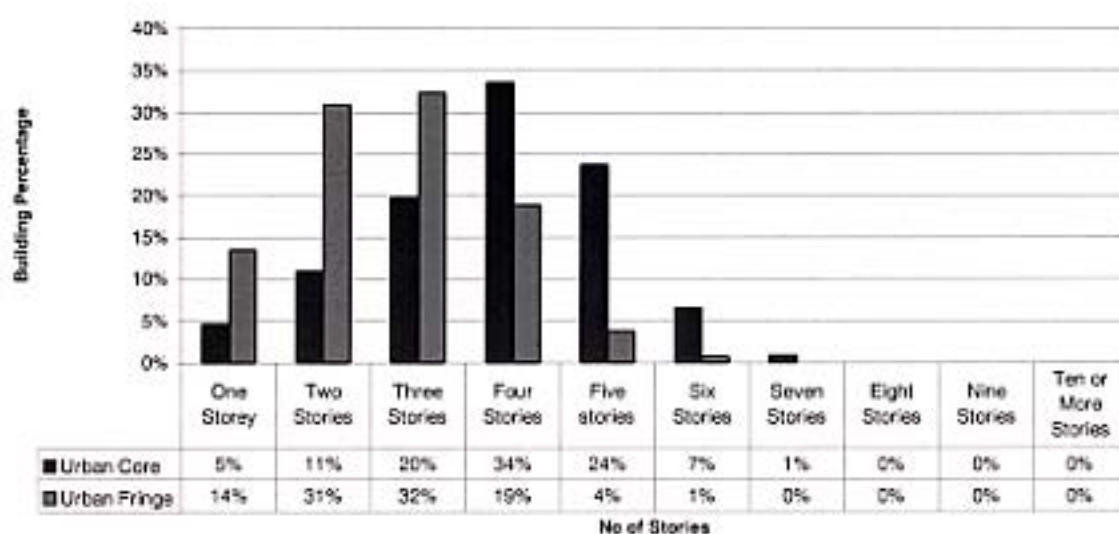
Number of Stories of Kathmandu Buildings

A majority of the existing buildings is 2-4 stories high. About 11% is five-storied, and about 11% is single storied. Considering the prevalence of masonry buildings, including those with mud as mortar, the vulnerability of the buildings should be regarded as very high.

In the urban core areas, 4-storied buildings dominate. More than a third of the buildings are 5-story or higher. This contributes to higher seismic risk if one considers the poor building technology adopted for the construction. In fact, quite a few of these buildings are masonry structures, at times in mud mortar.



Story wise distribution of Kathmandu Valley buildings

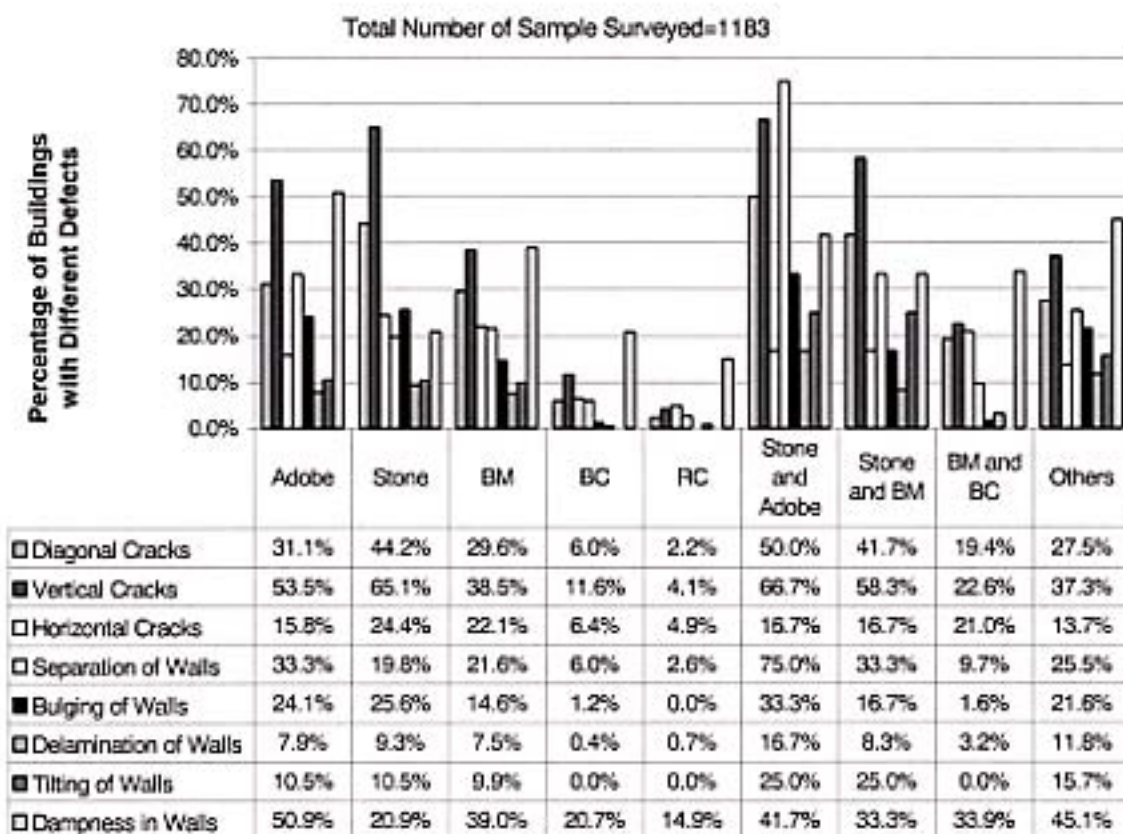


Story wise Distribution of Kathmandu Buildings in Urban Area

Defects in Existing Buildings

Mud-based buildings (adobe, and brick or stone masonry in mud mortar) are the building types with the maximum of visible defects such as cracks, wall separation, bulging, and tilting of walls. On the contrary, cement-based constructions such as brick-in-cement and RC frames exhibit lesser visible defects. However, about 12% of the surveyed brick masonry buildings in cement mortar exhibit vertical cracks, 6% show diagonal and horizontal cracks, and about 6% show separation of walls. Major problem in the RC construction (in about 5% of the buildings) is the development of horizontal crack, mostly along the wall-beam contacts.

Dampness is a serious problem in all-building typologies.



Prevailing Defects on Buildings in Kathmandu Valley

Quality of Building Construction

The building inventory survey did not explore the quality of building construction directly. It was not possible within the scope of works also.

However, while using the results of the building inventory for the purpose of earthquake vulnerability assessment and development of mitigation plan, it must

be remembered that a significant majority of the residential buildings are non-engineered, the construction process is without any prudent technical supervision, and the quality control of materials is almost non-existent, especially for the modern constructions.

**THE STUDY ON EARTHQUAKE DISASTER MITIGATION
IN KATHMANDU VALLEY**

**EARTHQUAKE VULNERABILITY ASSESSMENT OF EXISTING BUILDINGS
IN
KATHMANDU VALLEY**

Purpose:

The survey is organized under the Study on Earthquake Disaster Mitigation Project, in cooperation with the Ministry of Home Affairs (MCHA), of His Majesty's Government of Nepal. The survey intends to collect information on existing building typology and their condition in Kathmandu Valley and will be used for the Earthquake Risk Mitigation Planning. This will not be used for other purposes at all. The information provided to this survey will be very valuable in assessing vulnerabilities and for preparing disaster reduction plan. The information will be statistically processed without referring to individual house owners, and will be "CONFIDENTIAL"

**Part "A"
GENERAL INFORMATION**

100. Information of House Owner

101. Name of Owner:
102. Code
- 102.1. Building: 102.2. Photograph:
103. District:
104. Name of Metropolitan/Sub-Metropolitan / Municipality/Village development committee:
105. Ward No.:
106. Tola:
107. Locality
Urban Sub-urban Rural
108. Type of Settlement
Core Fringe
109. Did 1934 earthquake or 1988 earthquake or 1993 Flood/Landslide damage the building?
Yes No
110. If yes, was the building strengthened or repaired after damaged or reconstructed?
Repaired Strengthened Reconstructed
111. Is this building retrofitted?
Yes No If yes, please fill part "C" of this form
111. Process of building construction
Owner built Purchased Constructed by contractor

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Code of Building

**Part "B"
BUILDING DETAILS**

200. Details

201. Construction, Extension, Maintenance (fill in years B.S.) and use of each floor as mentioned below in the table:

Storey	Construction/Extension	Use	No. of Rooms	Maintenance	Registration
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Residential	1	Shop	2	Store/Ware House	3	Hostel/Dormitory	4
Restaurant	5	Office	6	Hotel/Lodge	7	School/Training	8
Factory	9	Clinic	10	Workshop	11	Others, if any	12

202. Who designed and supervised the building?

Storey	Designer				Supervisor			
	Self	Technician*	Contractor	Mason	Self	Technician*	Contractor	Mason
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

* It includes Engineer/Architects/ Overseers/On/In person.

203. Open Space

2031	Width of Street/Road leading to the buildingm
2032	Is there open space connected with the building Block?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2033	If yes, how big is it? m x m
2034	Is there any open space outside the building boundary, if yes how far is it?m

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Code of Building

204. Number of Occupants

Storey	Time Period			
	6 - 7 AM	8 AM - 5 PM	5 - 8 PM	8 PM - 6 AM
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Total				

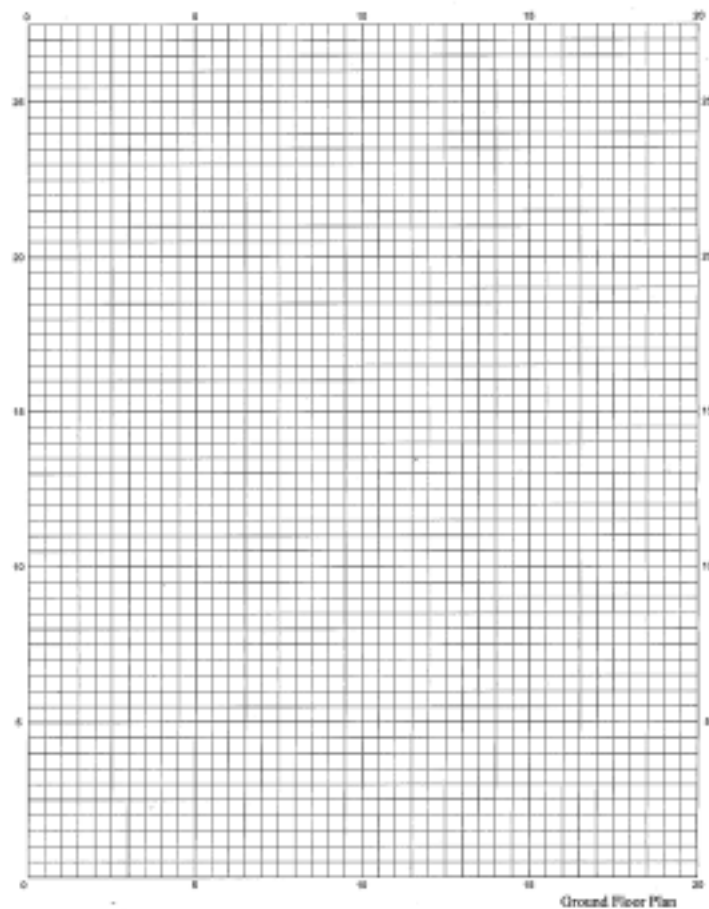
205. Land Property :

Plot	First	Second	Third	Total
Land Area in (Square, Area, Feet)				

- 300 Plans and Sketches
- 301 Site Plan

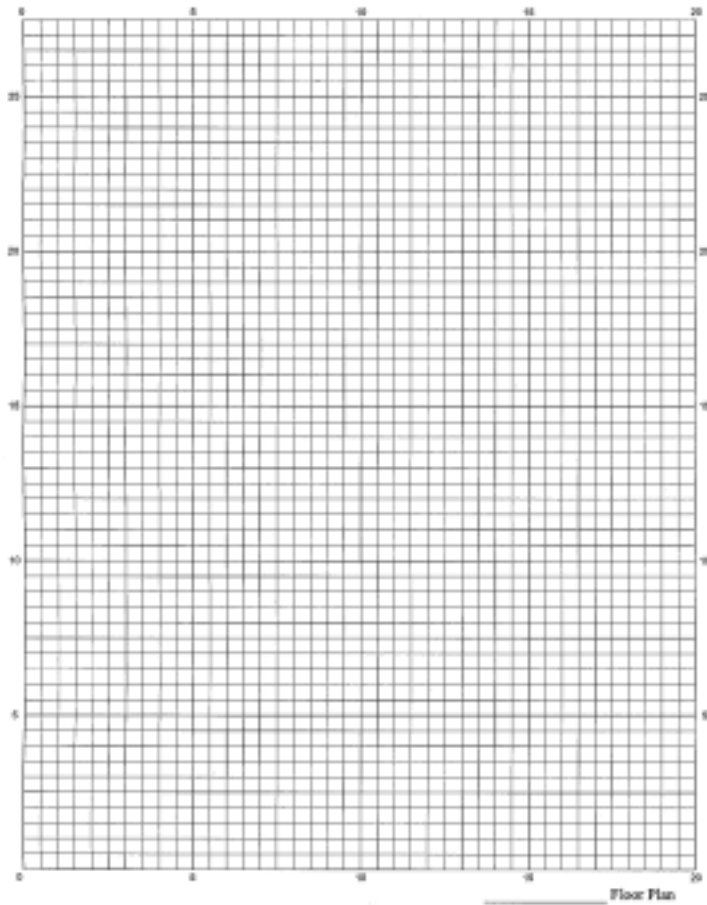
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302. Ground Floor Plan



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303. Typical Floor Plan

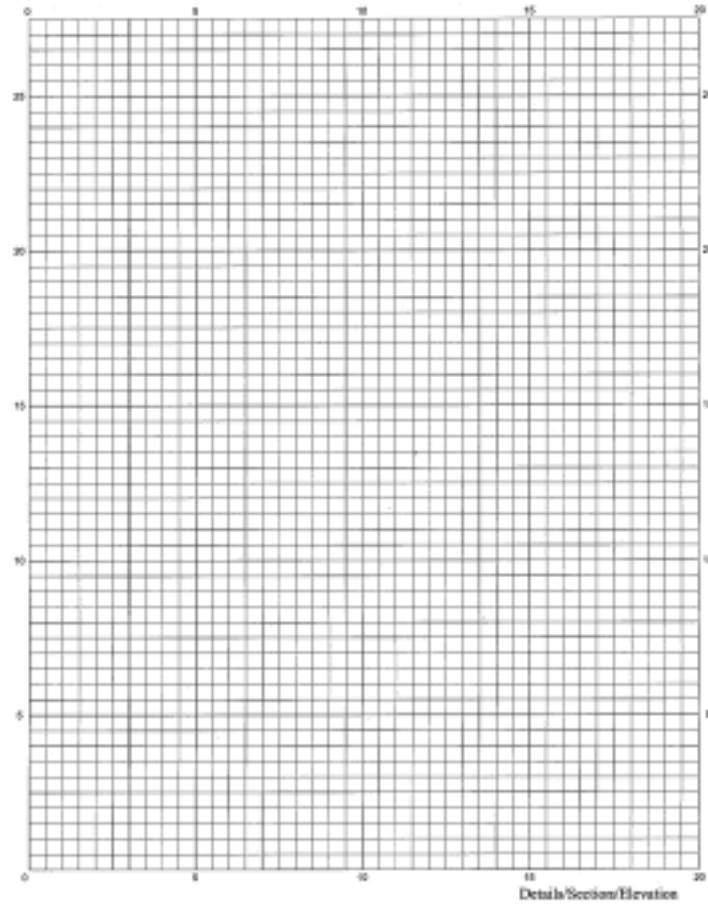


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Code of Building

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304. Sketches



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Code of Building

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499 Site Condition

Local Hazard (encircle the appropriate number)				
493	Is there any landslide area in the site?	Yes 1 No 2	493 Is the site of the Building block sinking?	Yes 1 No 2
494	Is there any rock fall area in the site?	Yes 1 No 2	494 Is the Building block standing on filled site?	Yes 1 No 2

495 Terrain Type (encircle the appropriate number)

1 Flat Terrain	2 Gentle Slope	3 Steep Slope	4 Terraced Land
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496 Position of the building block (encircle the appropriate number)

1 Free Standing	2 Confined by other building to one side	3 Confined by other buildings in two adjacent sides	4 Confined by other buildings in two opposite sides	5 Confined by other buildings in three sides
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500 General Planning

501 Shape of the building block in plan (encircle the appropriate number)

1 Square	2 Rectangle (L: < 30)	3 Narrow Rectangle (L: > 30)	4 T-Shaped Building
5 L-Shaped Building	6 U-Shaped Building	7 O-Shaped Building	8 Building with Central Courtyard
9 W-Shaped Building	10 Other Type		

502 Shape of the building block in Elevation (encircle the appropriate number)

1 Not Stepped	2 Stepped over the Center	3 Stepped over the End
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503 Cantilever with wall (encircle the appropriate number)

1 None	2 One side	3 Two opposite side	4 Two adjacent or three sides
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504 Configuration problem
Soft storey 1 Undefined load path 2 Short column effect 3

505	Number of stories
506	Average floor height
507	Average width of passage
508	Average width of stair

509 Location of staircase
Near the center of the building block 1 Near the end of the Building block 2

600 Building Structure (encircle the appropriate number)

601 Type of Foundation Sub-soil
Soft / Med. Soil (Silt/road) 3 Rock 1 Gravel / Sand 2 Unknown 4

602 Type of Foundation
Strip 3 Isolated Pad 2 Raft 3 Pile 4 Other if any:

603 Basic construction Material of Foundation
Adobe 1 Stone 2 Fired Brick 3 Reinforced concrete 4 Plain Cement Concrete 5 Steel 6

604 Mortar type in Foundation
Dry masonry 1 Mud 2 Lime 3 Cement and Sand 4 Other if any:

605 Basic structural system and Construction material, Wall/Fram (encircle the appropriate number)

1 Adobe or Mud wall	2 Even brick wall	3 Quarry stone wall
4 Dressed wall	5 Fired brick wall	6 Hollow concrete block wall
7 Reinforced concrete framed building	8 Timber frame with stone / brick wall	9 Timber frame with wattle clad

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686	Mortar Type in Walls (Put (✓) mark in appropriate box)	Mortar	Storey Number																	
			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th								
	1	Dry																		
	2	Mud																		
	3	Lime																		
	4	Cement and Sand																		

687 Exterior Wall Thickness (put (✓) mark in appropriate box)


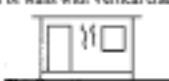
	1	2	3	4	5	6	7	8	9	Storey Number										
										1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
1	115 mm thick brick wall																			
2	100mm to 125mm thick hollow concrete block wall																			
3	230 thick brick wall																			
4	200 mm thick hollow concrete block wall																			
5	150 thick brick wall																			
6	400 mm (two brick) or more thick brick wall																			
7	Stone wall - less than 450 mm thick wall																			
8	400 mm (Two brick) thick masonry wall																			
9	Stone wall - more than 450 mm thick wall																			

688 Interior Wall Thickness (put (✓) mark in appropriate box)

	1	2	3	4	5	6	7	8	9	Storey Number										
										1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
1	115 mm thick brick wall																			
2	100mm to 125mm thick hollow concrete block wall																			
3	230 thick brick wall																			
4	200 mm thick hollow concrete block wall																			
5	150 thick brick wall																			
6	400 mm (two brick) or more thick brick wall																			
7	Stone wall - less than 450 mm thick wall																			
8	400 mm (Two brick) thick masonry wall																			
9	Stone wall - more than 450 mm thick wall																			

	689	690	691	692	693	694	695	696	697	Storey Number										
										1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
	Total length of exterior walls in north face																			
	Total length of doors and windows in north face																			
	Total length of exterior walls in south face																			
	Total length of doors and windows in south face																			
	Total length of exterior walls in east face																			
	Total length of doors and windows in east face																			
	Total length of exterior walls in west face																			
	Total length of doors and windows in west face																			



Defects in Building. Cracks should be through the wall thickness (Put (✓) mark in appropriate box)


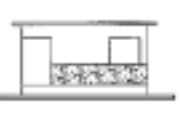
687	Number of walls with diagonal cracks	688	Number of walls with Vertical cracks	Storey Number			
				1st	2nd	3rd	4th
							
	None <input type="checkbox"/> 1-20 <input type="checkbox"/> 21-50 <input type="checkbox"/> 51-100 <input type="checkbox"/> More <input type="checkbox"/>		None <input type="checkbox"/> 1-20 <input type="checkbox"/> 21-50 <input type="checkbox"/> 51-100 <input type="checkbox"/> More <input type="checkbox"/>				

689	Number of walls with Horizontal Cracks	690	Separation of walls at T and L junction	Storey Number			
				1st	2nd	3rd	4th
							
	None <input type="checkbox"/> 1-3 <input type="checkbox"/> 4-7 <input type="checkbox"/> 8-10 <input type="checkbox"/> More <input type="checkbox"/>		None <input type="checkbox"/> 1 corner <input type="checkbox"/> 2 corner <input type="checkbox"/> 3 corner <input type="checkbox"/> More corners <input type="checkbox"/>				

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Code of Building

621	Bulging of walls	622	Delamination of walls	Storey Number			
				1st	2nd	3rd	4th
							
	None <input type="checkbox"/> 1 wall <input type="checkbox"/> 2 walls <input type="checkbox"/> 3 walls <input type="checkbox"/> More walls <input type="checkbox"/> None <input type="checkbox"/>		None <input type="checkbox"/> 1 wall <input type="checkbox"/> 2 wall <input type="checkbox"/> 3 wall <input type="checkbox"/> More wall <input type="checkbox"/>				

623	Tiling of walls	624	Depress in wall	Storey Number			
				1st	2nd	3rd	4th
							
	None <input type="checkbox"/> 1 wall <input type="checkbox"/> 2 wall <input type="checkbox"/> 3 wall <input type="checkbox"/> More wall <input type="checkbox"/> None <input type="checkbox"/>		None <input type="checkbox"/> 1 place <input type="checkbox"/> 2 place <input type="checkbox"/> 3 place <input type="checkbox"/> More place <input type="checkbox"/>				

625 Types of Lintel (encircle the appropriate number)

1 	2 	3 	4 
No lintel	Tubular lintel	Combined lintel	All round lintel

626 Material of lintel Wood Reinforced brick Reinforced concrete

627 Roof board/Wall plate (encircle the appropriate number)

1 	2 
Wall plate	All round roof board

628 If wall plate/roof board used, then material used Wood Reinforced brick Reinforced concrete

629 In case of masonry building, are metal bars introduced at corners and/or junctions? 	Yes <input type="checkbox"/> 1 No <input type="checkbox"/> 2	630 Are through stones used in walls, at corners and junctions of the masonry building? 	Yes <input type="checkbox"/> 1 No <input type="checkbox"/> 2
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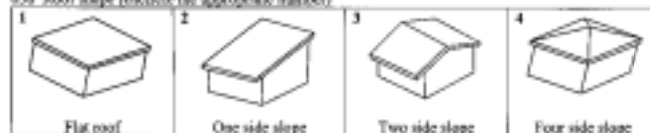
631 Are there gable wall in the building?	Yes <input type="checkbox"/> 1 No <input type="checkbox"/> 2	632 Are there parapet walls or railing on roof or verandah?	Yes <input type="checkbox"/> 1 No <input type="checkbox"/> 2
633 Height of parapet wallm	634 Thickness of parapet wallm

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Code of Building

635	Floor structure and floor finish (encircle the appropriate number)	1	Wooden joist + plank	Shore
		2	Wooden joist + plank/wood or bamboo slaps or brick + mud.	
		3	Wooden joist + plank/wood or bamboo slaps or brick + concrete	
		4	Reinforced concrete / Reinforced brick and concrete / Reinforced brick slab	
		5	Jack arch floor	

636 Roof shape (encircle the appropriate number)



637	Roof structure and roof covering (encircle the appropriate number)	1	CCl sheet on timber / sagittand/Plaster / bamboo structure
		2	Tile or slate on mud / timber/bamboo structure
		3	Thatched on earth ball over timber / bamboo structure
		4	Thatched roof over timber / bamboo structure
		5	Reinforced concrete / Reinforced brick and concrete / Reinforced brick slab
		6	Jack arch roof

638. Condition of Building: Good Satisfactory Bad Very bad

PART "C"
RETROFIT DETAILS

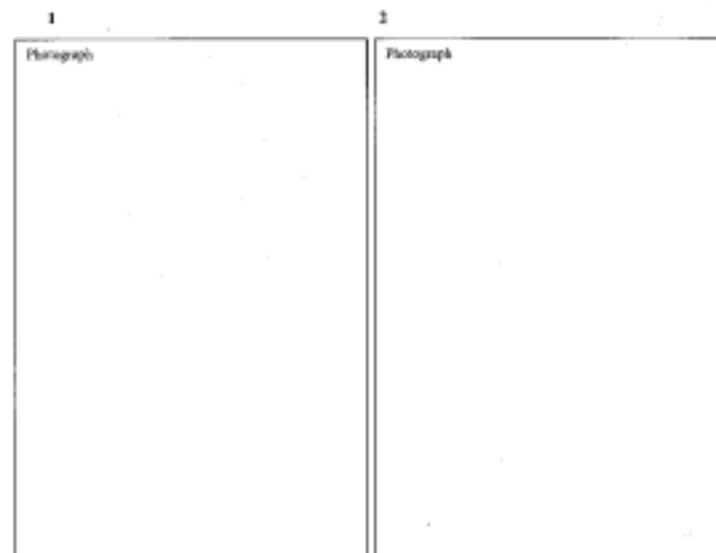
700. This part is applicable only to the retrofitted buildings.

701. Method of retrofitting of masonry building.
 Spline & Bandage Beam & Column
 Belting Jacking of Walls

702. Method of Retrofitting of RC framed building.
 Column Jacking Addition of Shear Walls

SURVEYOR INFORMATION	
888. Surveyor's Details	
801. Name:	802. Designation:
802. Institution:	
803. Contact address:	
804. Telephone:	Fax: E-mail:
805. Date: / / 2001	806. Signature:
807. Date: / / 2001	808. Supervisor's Signature:

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Comments:

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