

Case Study on Shahberi Twin Building Collapse

Dr. Anshu Tiwari^{1*} Dr. Abhay Shrivastava²

¹ Faculty, Disaster Management, Haryana Institute of Public Administration, Gurgaon

² Head, Centre for Disaster Management, Haryana Institute of Public Administration, Gurgaon

Abstract – Shahberi village is situated in Greater Noida and covers an area of approximately 150 acres. Being close to NH-24, ABES Engineering College, Railway Station, Fortis Hospital, Noida City Centre Metro Station and close proximity with Delhi, Ghaziabad and Noida, the place is attracted by the lower middle class families who moved to urban centres for location benefits. Most of them are lured because of relatively low rates of residential accommodation being offered by unscrupulous builders. The village has more than 200 building apartments and many more under construction without any approved plans.

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BACKGROUND



Shahberi was primarily an agricultural land that had been notified by the Greater Noida Authority in 2008. The area had initially been acquired under the urgency clause and even leased out to builders, but the acquisition process stalled following a Supreme Court Order in 2011. No fresh acquisition took place after the court order, but the villagers who had been given compensation during the earlier process did not return the money and sold the land to builders at low price. Since the concerned authorities left the place unchecked, the builders started constructing the houses without licence and approved plans. Illegal structures are being developed in the area without following building codes or obtaining mandatory approvals.

INCIDENT

The building collapse incident happened in Shahberi village of Greater Noida on 17th July, 2018 around 9:30 p.m. There were two buildings, 4 storey completely constructed building was two year old, and another was 6 storey under construction. The buildings stood next to each other on the marshy land and were separated by a 5 feet wide road.



The building under construction tilted into the older building, whose left side was the first to cave in and crumble into rubble due to water logging in foundation and too much of moisture in the walls of the basement of the collapsed buildings. The older building also disintegrated and caved in, barring a part of its right edge. One fell in pancake form and the other tilted to its side. Beams and slabs fell on the occupants of the building, sandwiching people and leaving all the occupants dead. Some bodies were pierced by iron rods and concrete and other were trapped under several layers of concrete. In all, 9 people died being trapped in the debris.



The twin buildings collapsed due to unapproved construction going on at that site. Local residents mentioned that the place where collapse has taken place had some water body which was filled to construct residential flats. The land of this area is not hard enough to withstand heavy construction and in absence of proper system of disposal of sewage and garbage the soil has become swampy because of water logging resulting weakening of foundation of building. Most of the buildings in that area are over five-storey and that too in water inundated land. Unplanned construction is rampant in the area over stepping all safety norms. The construction took place without any design by qualified engineers and reinforced concrete-framed structure.



The other reason for collapse was that the construction is done with the sub-standard building material including fly-ash bricks and pillars developing cracks even before any substantial construction took place. And the moment six-storey under-construction building collapsed on fully constructed and occupied adjacent building, it leads to a complete fall.

RESPONSE

As soon as collapse took place around 09:30 p.m., local residents informed police and the officials from police and administration reached at the site immediately.

POLICE

Police got the information about the incident in control room via local person passing through the way near incident. Just after receiving the information, control room informed Police Response Vehicle and local police chowki. The local police along with the administration reached to the site within 15-20 minutes and cordon off the area within half an hour. They also informed NDRF though NDRF got the information from news flash and started moving from Ghaziabad to reach the site. Before the NDRF reached, the police department arranged heavy vehicles like dumper, JCB etc. They also called electricity department and cut off the electricity to avoid any further accident. They also informed fire and health department.

NDRF



The NDRF came to know about the twin-building collapse in Shahberi village of Greater Noida through the news channels in control room. Later, while moving towards site, they also received call from local police. The Deputy Commandant, NDRF instantly deputed 5 teams of NDRF to start search & rescue operation at incident site. The teams were dispatched in phases. In the first phase, the deputy Commandant ordered to move the NDRF Quick Response Team with himself in light vehicles considering narrow and dilapidated road full of potholes. The first team left at 10:35 PM. However, the narrow roads in the area resulted the late arrival of heavy vehicles. The second team with equipments left for the incident site at 11:25 PM. The 3rd, 4th and 5th teams were ordered at 12:25 PM to arrive at the incident site with needed equipments. In all 12 GOs, 23 subordinate officers, 180 other officials and 7 canines of NDRF were deployed for the effective management of incident.

SEARCH & RESCUE:



When NDRF team reached place of collapse, they first contacted District Magistrate and SP already present at the site and requested them to manage the crowd who was standing on the heave of soil around the collapsed building. The NDRF team also conversed to other local people to know the whereabouts of the occupied family. They were being informed that about 20-25 people are trapped inside the collapsed building.



The search & rescue operation started instantaneously after analyzing the situation. Firstly, canine search (Dog squad) was done for locating missing, trapped or injured people but nobody was found at that moment. Thereafter, the rescue radar technique was used for identification of live victims under rubble but none of the victims were found alive. Victim location camera was also used to find trapped victims under debris but all the efforts to find live person gone to vain.



During search operation, search light and pelican head light were also used for lighting since it provide beam of light with no dark patched and can cover upto 400 m distance. While searching, one body's leg was seen in the basement front base.



The light chipping hammer was used for cutting the debris at random places while heavy and medium chipping hammers were used for heavy duty work for demolition. Iron bar cutter (RP Shaw), Hydraulic Bolt cutter and Gas Cutter were also used for cutting the iron rods and debris. The gas cutters were arranged by local police from market. During the operation, it was realized that the hydraulic bolt cutter was very successful being easy to move and handle for cutting at any place.



Gasoline, grinder and chipping hammers were used for iron cutting and concrete chipping for retrieving trapped dead bodies under the building's rubble. 5 KVA Generator set (Petrol & Diesel type) was found to be most helpful since it can operate two heavy equipments simultaneously. (complete list of equipments is placed at Annexure A)

Wood cutter was also used in retrieving the dead bodies. Two bodies were found in basement front base and three bodies were found lying on sofa. It took 66 hours to NDRF to complete the Search & Rescue operation and with no alive victim.

FIRE DEPARTMENT

UP Fire Brigade reached to incident site with ASKA light and fire vehicles but there was no use of fire brigade since no fire incident took place at the site. Meanwhile, the fire department helped the NDRF in debris removal.

SDRF

Though the incident took place on 17th July, 2018, the State Disaster Response Team reached on 19th July, 2018 without any equipment except hydraulic (bar) cutter which also got defunct after for half an hour. SDRF only assisted NDRF but only for some time and also returned back to Lucknow on 19 July itself.

HEALTH DEPARTMENT

Ambulance of civil hospital and 2 ambulances from nearby private hospital also reached within 30 minutes. The ambulances had basic facilities for first-aid. CMO and medical staff from civil hospital also reached at the site thereafter. Since, no injured victim was retrieved from the debris, the services of ambulances and medical doctors were not used. The dead body vans were available for carrying the dead bodies. All the dead bodies were shifted to hospital and after identification they were handed over to their family members.

LESSONS LEARNT

Densely populated illegal construction in Shahberi village with several multi-storey buildings along with furniture market in the vicinity has raised the serious safety issues of residents which needs to be addressed immediately otherwise there are more disasters of the kind waiting to happen. Some of the lessons we have learnt for timely action are:

- The constructed/under-construction building should be surveyed from hazard and vulnerability point of view.
- A strict action should be taken instantaneously on illegal/unauthorized construction to avoid the incidents.
- Concerned authorities should check the licence and approved plans before any construction take place by builders.
- Officers who overlook everything should be held responsible and strict action should be taken against them.
- The builders should not get benefitted by the lack of administrative action.
- The blind eye of administration against the complaints lodged regarding illegal construction encourage builders to use

inferior construction material which eventually leads to the tragedy. It should be taken care of and administration must deal with the complaints pertaining to unauthorised construction and alterations to buildings.

- Strict measures needs to be implemented for encouraging the builders/owners to follow NBC codes like soil testing, construction material etc.
- Structural audit of building should be done by the competent authorities. Unauthorized construction needs to be taken up as a punishable offence.
- Strict action should be taken against those involved in illegal constructions.
- Accountability of officials should be fixed who are violating the rules and they should be booked.
- The accountability of civil engineer and architect need to be fixed for the construction quality of building along with the builder.
- Occupancy without compliance should be made punishable.
- State Disaster Response Force should be equipped with necessary equipments to act as first responders which can be discussed with NDRF.

Annexure – A

1.	Air Lifting Bag With two Cylinder
2.	Angel Cutter
3.	Bullet Chain saw for carbide Tipped/Wooden Chain Saw
4.	Come Along
5.	Cordless Hammer Drill With kit
6.	Rotary Hammer Drill With kit
7.	Reciprocating Saw With Blade
8.	RAM Set Complete
9.	Gen Set 2.5 KV
10.	Headlight
11.	Inflatable Light
12.	Mega Phone
13.	Metal Tube
14.	Shoring Flank
15.	Level
16.	NDRF Banner
17.	Paint brush
18.	Pass (Distress signal unite)
19.	Pick Mattock
20.	Plastic Bucket
21.	Pry Bar
22.	Safety Cone
23.	Scene tape

24.	Screw driver set
25.	Shovel
26.	Sledge Hammer 7 Kg/10 Kg
27.	Spade
28.	Spray Paint Orange
29.	Tarpaulin 6x6 mtr
30.	Tin Snip
31.	Torch steel With cell
32.	Ventilator Complete
33.	Wise Grip
34.	Working Lamp
35.	Brick Hammer
36.	Bolt Cutter
37.	Carabineer
38.	Carpenter Hammer
39.	Sealing
40.	Chisel
41.	Crow Hammer
42.	Crow Bar 2'
43.	Crow Bar 3'
44.	Extension Cord
45.	Hard board with straps
46.	Framing square set
47.	Hack Saw
48.	Hand Saw
49.	Knee pad
50.	Safety Goggle
51.	Working Gloves
52.	Multipurpose rope
53.	Rope Nylon
54.	Combi Tool With Power Unit
55.	Rotary Rescue Saw
56.	Breaching system
57.	Victim Locating Camera
58.	Diamond Chain Saw
59.	Life Detector Type-I
60.	Tent 04 man, 06 man, 10 man
61.	M. oil
62.	2T oil
63.	Petrol with Jericon
64.	K Oil With Jerkin
65.	MFR Kit Complete
66.	Water mist fire extinguisher
67.	Chiping Hammer med/Heavy
68.	Electric drill machine
69.	Power strip
70.	Solar light
71.	Crow bar big/small
72.	Latex glause
73.	Puli
74.	Disender
75.	Full body harness
76.	X-mat Kit

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Corresponding Author

Dr. Anshu Tiwari*

Faculty, Disaster Management, Haryana Institute of Public Administration, Gurgaon

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