

Demolition of concrete buildings

A. A. B. MUSANNIF

Mr T. S. Kriebel, A. Ogden & Sons (Demolitions) Ltd

I would like to give three case histories involving the demolition of concrete structures.

56. The first example concerns a 3500 ton capacity coal bunker. This heavily reinforced structure was 50 m high and had a plan area of 17 m × 17 m. It stood on two rows of four main columns, each approximately 1 m square. The structure was demolished by the use of controlled explosives. A toppling situation was achieved by blasting out completely a section of each column on one row on the side to which we required the structure to collapse. Additional drilling and blasting of heavy beams and some platforms was carried out, with blasting on a delay to the main columns.

57. The above procedure assisted in breaking up the structure on impact. Dropping a building safely, together with maximum fragmentation, is the ultimate desired end result.

58. The final operation was to ball where required conventionally and remove the resultant debris with a Caterpillar 235 specially guarded and adapted for demolition.

59. The second case history is for a large cooling tower on a working power station. This tower, which was structurally defective, was one of six towers in a very congested area where the five other towers, coal conveyers, live 6 ft dia. mains, pumps and adjacent plant were all in operation. The water pipe was 10 ft from the defective tower.

60. The tower was demolished by controlled explosives. The timber packs were left in because of the poor condition of the tower. The tower was collapsed and telescoped to the ground within the circumference of the base pond.

61. The demolition of cooling towers is not a simple matter of blasting out supporting legs. Every tower has to be assessed separately and the method of demolition adjusted accordingly. The ratio of height to diameter, the actual shape and position of the curved throat, the height of legs, reinforcement of legs and shell, depth of pond, position of conduits and their design—all these items have to be analysed before the actual drilling and charging patterns are finalized. In physical terms this means that work has to be carried out in many areas in addition to the support legs.

62. The third example concerns two blocks of maisonettes, eleven storeys high and each weighing 10 000 t, which were demolished by controlled explosives. In

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plan they consisted of two T shaped blocks. The stem of each T was approximately 200 ft long, and the head was approximately 140 ft long. The structure was 120 ft high overall.

63. They were reinforced concrete structures on piled foundations with supporting legs to a first floor raft. Above this raft was a slipformed shell with diaphragm walls. The result was a box of immense strength.

64. This operation was the first of this type carried out in the UK. The preparatory work took three months, blowdown took 30 s, and the clearance of 20 000 tons of debris took six weeks.

65. Adjacent to the structure were a main railway tunnel (16 m away), a pub (17 m away), a church and some flats. A main sewer, a gas main and high voltage cables ran between the blocks as close as 6 m. These features ruled out any possibility of a complete drop and dictated that any blowdown had to ensure:

- (a) sections would be a maximum of 600 t;
- (b) these sections would drop at precisely timed intervals;
- (c) the sections would collapse in the required direction;
- (d) they would have sufficient energy to ensure break-up impact, while keeping vibration limits to a minimum.

66. The actual demolition operation produced a textbook result. It was achieved by placing 9000 separate charges coupled by 11·26 km of cordtex fuse, delay detonators and elaborate sequential instrumentation.

67. The use of controlled explosives for this demolition had numerous advantages over more conventional methods. Briefly it is safer for the work force, quicker and cheaper, and it causes less inconvenience to the local residents.

Mr Musannif

The first case is a typical example of toppling buildings on to their sides as mentioned in the Paper.

69. Demolition of cooling towers using explosives is a well known application. It was not mentioned in the Paper since this dealt with concrete buildings.

70. The third case is of particular interest. It was the first operation of this type in the UK and demonstrated that high rise blocks in urban areas may be safely and economically demolished using explosives.