

**Explosive demolition was the method of choice in February 2008 for the demolition of an office building in the centre of Dortmund, Germany. Other methods were ruled out by the confined site and nearby surrounding structures. D&Ri reports on this demanding demolition challenge**



# City blast



**This Dortmund demolition job created a major challenge for the three German contractors tasked with its demolition**

**W**hen German insurance company **Volkswahl Bund Versicherungen** decided that it wanted to replace its 40-year-old office in the German city of Dortmund with a new complex that would provide greater space, it created a challenge for the German demolition industry.

Some elements of the building stood 62 m (204 ft) tall, and it was located at a busy city road junction. But this was not all – parts of the building stood over a railway tunnel that ran underneath the basement.

**The nature of the site dictated that the collapse of the building be carried out in a precise, controlled fashion according to a detailed plan**



## Limited choice

The use of a traditional wrecking ball and mobile crane was ruled out because that would have required road closures. A high reach excavator with sufficient height to reach the top of the building was not available, and other methods, such as demolition by hand, were deemed to be overly expensive.

As a result, it was decided to use explosive demolition despite the difficulties of the site and the presence of the tunnel since this offered a quick and sure solution.

The blast concept that was developed by structural engineer Dr Rainer Melzer provided for a "zigzag folding" of the building onto its footprint, avoiding potential damage to surrounding structures.

To prepare for the demolition, high reach excavators were brought on site to demolish those parts of the building that they could reach, and soft strip was carried out on the main structure. It was then prepared for demolition.

First, the lowest basement level of three was pumped full of concrete (this remained after demolition to form the foundation of the new building) and the second lowest was filled with demolition debris due for recycling.

This was intended to act as a 'cushion' to reduce vibrations resulting from the fall of the building.

The three lowest floors of the building were emptied, with charges set from a height

of 8 m (26 ft), extending in a triangle in the next three floors. Further blast zones were set at 12 m (39 ft), 19 m (63 ft) and 33 m (108 ft) with detonation delays of up to 3.5 seconds. In all 50 kg (110 lb) of explosives were used on the job, split into 250 individual charges. Some linear shaped charges had to be used in order to cut some beams that were discovered during the preparations for the blowdown.

Over 7,000 m<sup>2</sup> (8,400 yd<sup>2</sup>) of geotextiles, wire mesh and scaffolding were placed around the building, particularly around the blast zones, that was intended to act as both active and passive protection during the implosion.

A total of 6,280 tonnes of demolition debris resulted from the blowdown, with a total volume of 12,400 m<sup>3</sup> (16,200 yd<sup>3</sup>).

## Going to plan

When the charges were eventually set off, everything went precisely to plan – the building collapsed like a folding rule into the very tight space on top of the bank of material scheduled for recycling. The railway tunnel was closely monitored during the implosion for adverse vibration impacts – levels reached just 4.15 mm/s, little more than 10% greater than expected. In order to mitigate the worst effects of dust arising from the implosion itself, a number of fire hoses were used around the site to play water over the building as it fell.

The demolition contractors involved in the project, Dortmund-based Sticker, Dusseldorf-based Prangenberg & Zaum and Herne-based Heitkam Umweltschutz, then cleared the resulting demolition debris. In addition to the blast design and structural expertise supplied by Dr Melzer, the services of Kausldorf-based blast contractor Thueringer Sprenggesellschaft were central to the success of the project. **d&ri**



**Ready for blowdown, Soft strip has been carried out, surrounding lower associated structures cleared and charges are set**

**The Volkswahl Bund insurance building occupied a heavily congested site area, with a railway tunnel running**

