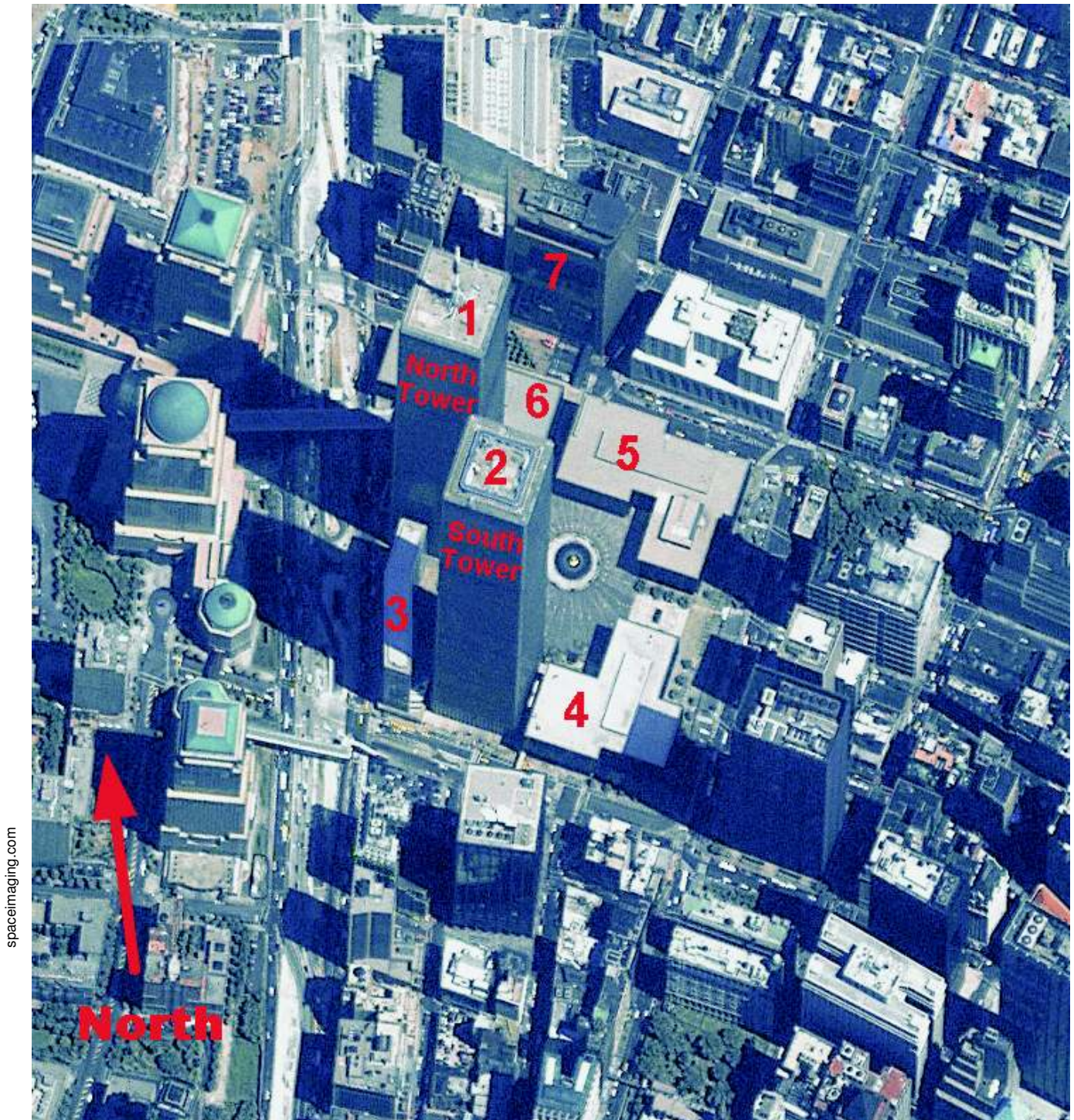




The Location and Structure

Figure 3-1 is a section of a photo taken on June 30, 2000 by the IKONOS satellite. The towers were identical in appearance except for one feature, namely, there was a

large antenna on top of the North Tower. The South Tower had an observation deck instead. Therefore, look for the antenna when you are wondering which tower is which.



spaceimaging.com

Figure 3-1 The World Trade Center from satellite, as of June 30, 2000

The 47 Core Columns

At the center of the towers were 47 steel columns laid out in a slightly irregular, rectangular grid. These are often referred to as “core” columns. Figure 3-2 shows the location and orientation of these core columns, and the position of the airplanes when they hit the towers. The airplanes are the correct size in relation to the buildings, so if the airplanes seem small it is because the towers were so large. The entire airplane could fit inside a tower if the floors were tall enough and if there were no core columns or elevator shafts in the way.

The size and dimensions of the core columns varied at different elevations in the tower. At the base of the tower the walls of the core columns were 100mm (4 inches) thick, while at the very top of the tower the walls were only 6mm (¼ inch).

Figure 3-3 is a simplified diagram to show the arrangement of the exterior and core columns. Along the outside of the towers were steel columns every meter. There was a total of 236 of these exterior columns, although this diagram shows only 16. These columns were literally on the exterior of the tower. There was also a column at each of the four corners, making a total of 240 columns, but those four columns were inside the tower.

The gaps between the 47 core columns was used mainly for elevator shafts, stairways, utility rooms, and hallways.

By putting some of the columns in center of the tower and the others along the outside, there was an enormous amount of open space along the windows for people.

Figures 3-4 and 3-5 show some of the thicker core columns. Both photos can also make you wonder how the workers could claim they were looking for survivors. Nobody could be alive in those smoking piles of hot rubble.

It is also interesting to note that the rubble consists only of short steel beams and dust; no office furnishings, steel assemblies, or large pieces of the concrete floorings.

Figure 3-6 shows a core column, sliced into pieces and ready to sell as scrap metal. As is typical of photos of the rubble, there is no sign that the core columns buckled or bent. Rather, most columns appear to have broken at their joints. The columns were obviously very strong, but the joints appear to have been weak.

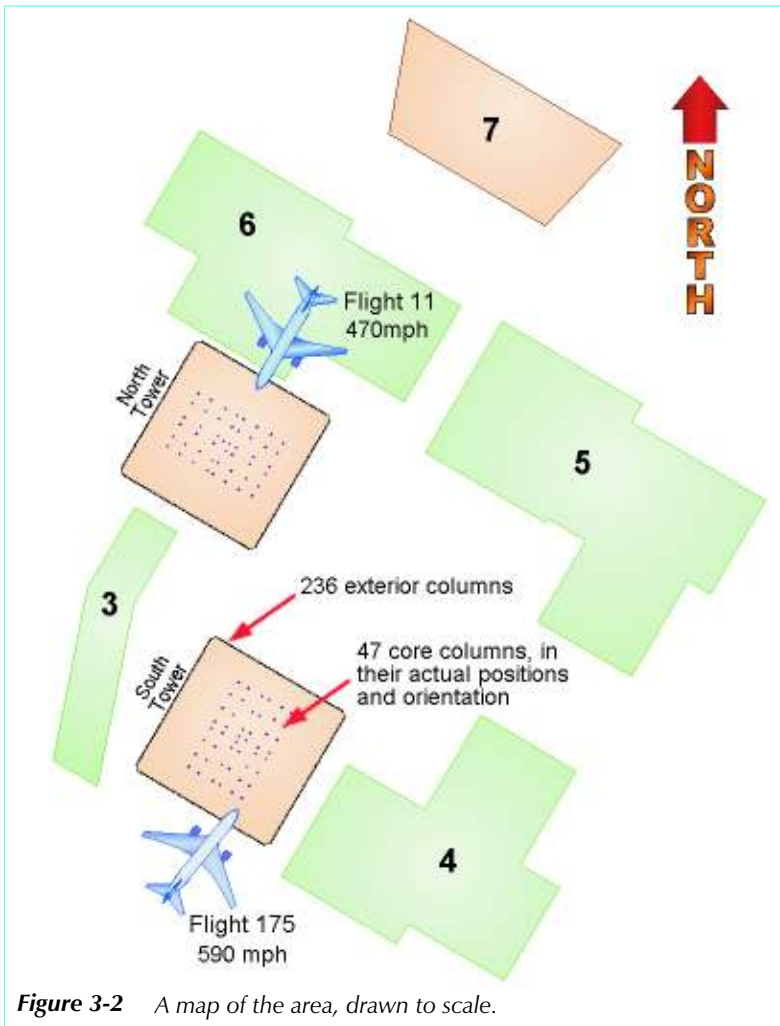


Figure 3-2 A map of the area, drawn to scale.

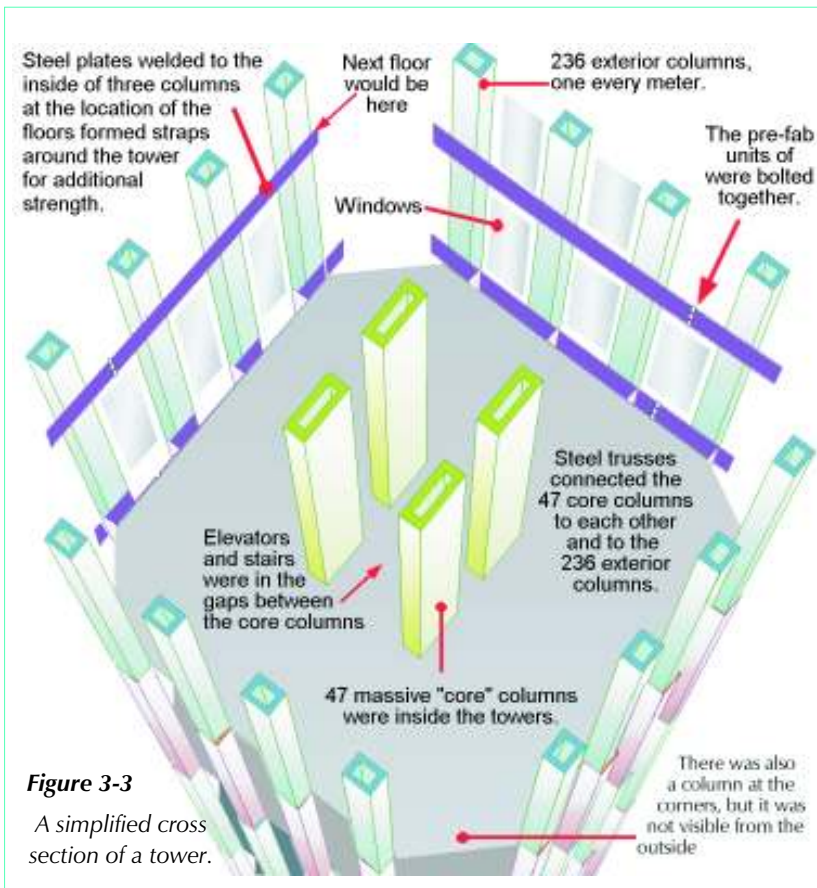


Figure 3-3 A simplified cross section of a tower.

** Unknown photo **



The large rectangular columns are **core** columns.

Figure 3-4 The workers are cutting the steel with giant torches.

** Unknown photo **



Figure 3-5 The core column in the center appears cut by a torch. The workers cut the steel so quickly that it is difficult to determine which damage was from them.

The 236 Exterior Columns

Figure 3-7 shows a cross-section of three of the exterior columns. Each column is a different thickness to show how the thickness varied from the bottom of the tower to the top. The steel was as thick as 100mm in the columns near the ground, but only 6mm at the top. A cross-section of one the most massive core columns is included in this figure to show its size and shape compared to the exterior columns. A core column with 100mm walls would be near the bottom of the tower.

Note that a fire inside the building would be in direct contact with only one of the four walls of these exterior columns; three walls were surrounded by the outside air. This made it difficult for a fire to raise the temperature of the exterior columns by a significant amount.

Three steel plates were welded to three columns while they were on the ground, creating a prefabricated unit (Figure 3-8). The units were hoisted into the tower and bolted together in a staggered manner (Figure 3-9). Supplemental welds were added to units near the bottom of the tower for additional strength. These plates formed straps around the tower.

Figure 3-10 shows two exterior columns that are still attached to the steel plates that formed straps around the tower. The thickness of the steel and the six bolt holes at the bottom of each column indicate that these were somewhere in the bottom half of the tower. Columns higher up in the tower were made of thinner steel and had only four bolt

holes on each column. Figure 3-11 shows the bolts that held the prefab units together.

Some people believe the towers collapsed because they were weak, but the steel in these towers was very thick and strong. The strength of the steel structure enabled the towers to survive the initial crash of the airplanes. The towers shook briefly, and then settled down.



Figure 3-6 Core columns, sliced and ready to sell as scrap. This photo was taken at the WTC on October 3rd, 2001.

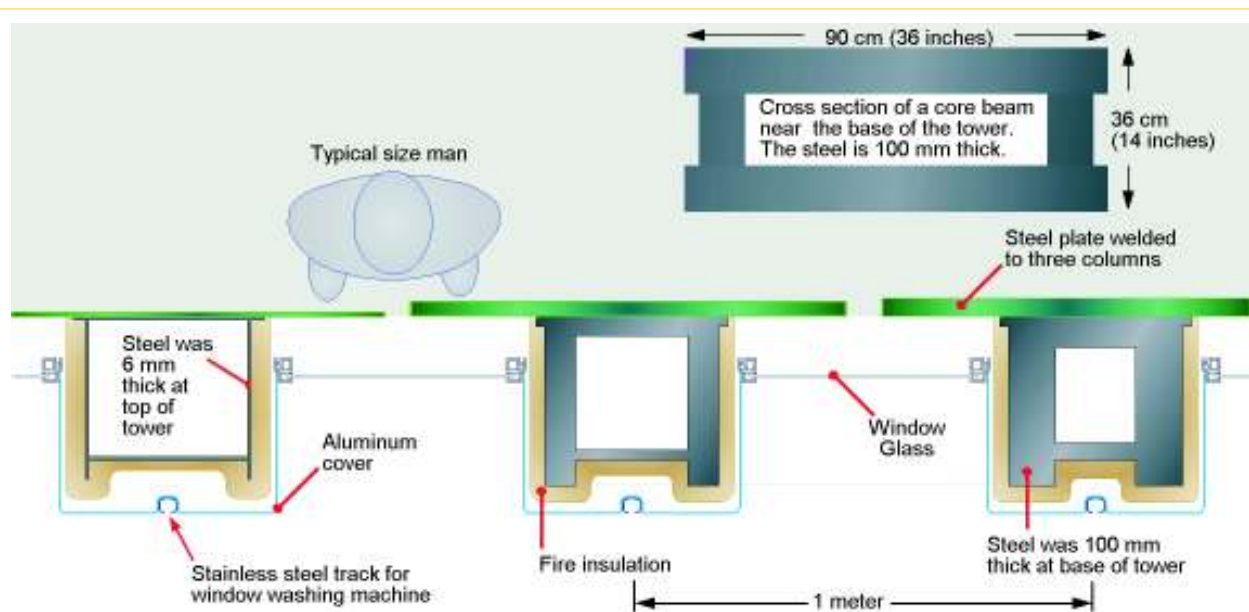


Figure 3-7 Cross section of exterior columns. The steel in each of these three columns is a different thickness to show how the columns varied from the bottom to the top of the tower. The thinnest column would be at the very top of the tower, and thickest would be at the ground. A cross section of the most massive core column is shown for a size comparison. A core column that thick would be at the bottom.

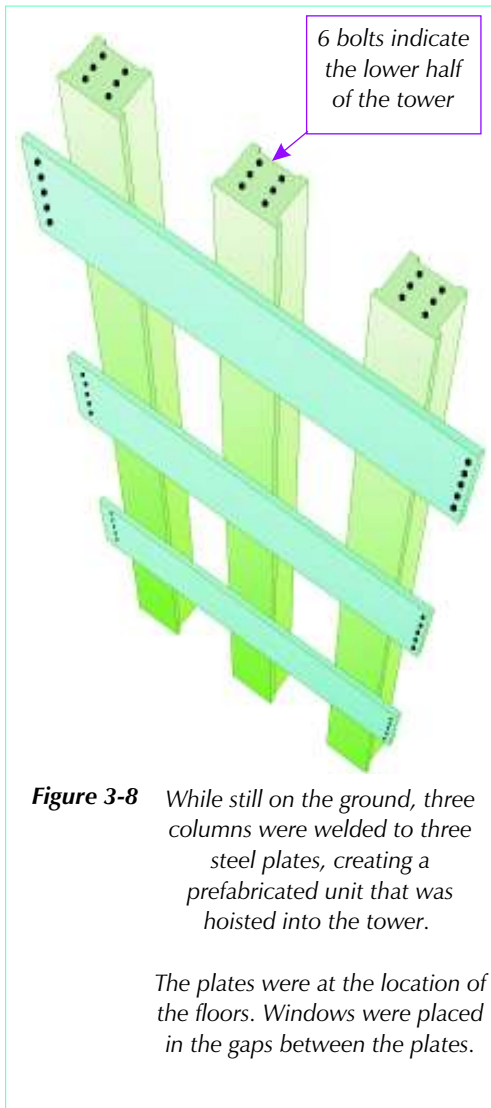


Figure 3-8 While still on the ground, three columns were welded to three steel plates, creating a prefabricated unit that was hoisted into the tower.

The plates were at the location of the floors. Windows were placed in the gaps between the plates.



Figure 3-10 Two columns still attached to the three plates that made a pre-fab unit.

The six bolt holes at the ends of the columns indicate that these were in the lower half of the tower. The units in the upper section had only four bolt holes.

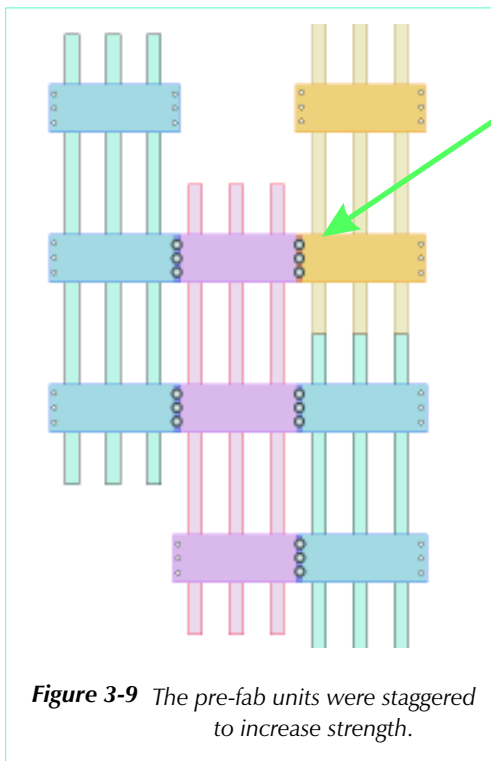


Figure 3-9 The pre-fab units were staggered to increase strength.

Bolts held the pre-fab units together



Figure 3-11 The bolts holding the pre-fab units together.

The Floors were Grids of Steel

I have seen remarks on the Internet in which the floors are referred to as “slabs of concrete,” as if the towers consisted of a stack of thin slabs of concrete connected to vertical beams in a precarious manner. Some people believe the towers collapsed after one slab fell down to the slab below, thereby starting a chain reaction. This has been called the “Pancake Theory” because the slabs of concrete pile on top of each other in a stack.

Concrete is used as a structural material in some bridges and buildings, but in the World Trade Center towers it was only a *flooring material*. The concrete was *not* holding the building together. Rather, the building was a 3-dimensional network of steel. Figure 3-12 is a view of two of the floors. The view is towards the windows, from a location near the core beams.

This diagram does not show all of the steel beams in the flooring. There was a similar set of trusses that ran perpendicular to the beams shown and connected to the columns on the other side of the tower. (The three purple lines along the right edge of the diagram show the direction and location of these criss-crossing trusses.) There were also

diagonal braces at the ends of every truss to further stiffen them (two sets of these braces are shown as purple lines.)

Each floor was a network of steel beams, covered by corrugated steel deck, which in turn was filled with concrete. The trusses also held such items as heating and air-conditioning ducts, telephone lines, ceiling tiles, and electric power lines.

The concrete was 100mm (4 inches) thick, which gave it substantial strength, but to describe the floors as being “slabs of concrete” is as silly as describing the floors as “sheets of carpeting.” The floors were **grids of steel**, or a **mesh** of steel. The concrete was just a filler to provide a flat and fireproof floor. Furthermore, these grids of steel were connected to the columns in a very sturdy manner.

The 47 core columns were also connected to each other by steel beams. The concrete in the floors in the core area was 125mm (5 inches) thick.

Trivia: the steel beams in the towers were so thick that American steel companies supposedly could not produce them. According to FEMA and other sources, nearly all the thick steel plate was produced in Japan.

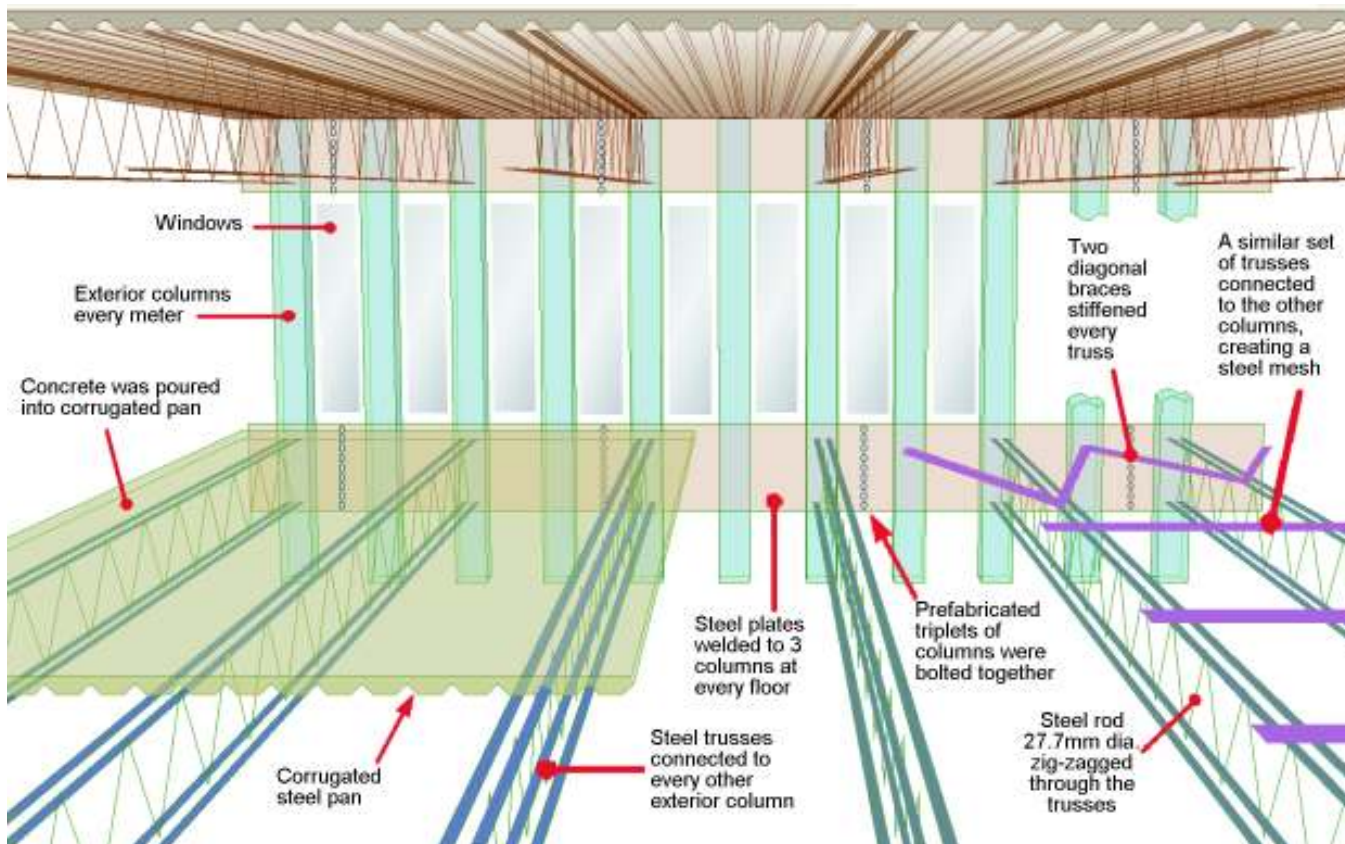


Figure 3-12 This is a view of the flooring between the core and exterior columns. The view is from the core columns towards exterior columns.

There were 56 exterior columns along each side of the tower. A truss connected to half of them, and diagonal braces connected the trusses to the other half. The trusses also connected to the 47 core columns. A similar set of trusses connected to the vertical steel columns created a steel mesh.