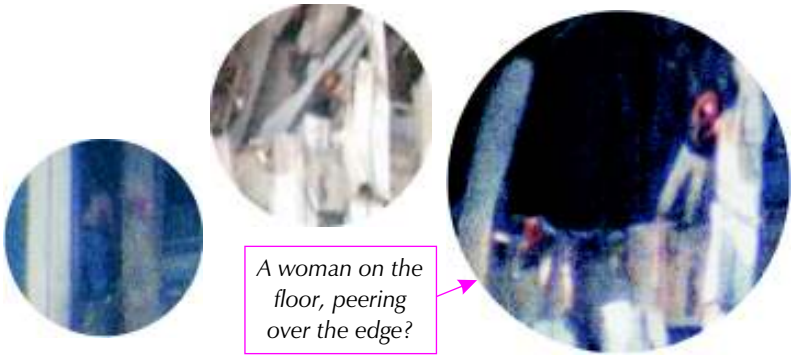
What Effect did the Fires Have?

The North Tower is hit first

Flight 11 crashed into the North Tower at 8:46 AM, hitting between floors 94 and 98. The hole created by the airplane (Figure 4-1) show that it broke through 45 of the exterior columns. The airplane was in the process of making a turn when it hit the tower, which is why the hole appears tilted.



A woman on the floor, peering over the edge?

FEMA's analysis of the hole shows that the fuselage and engines damaged three floors, but the wings did minimal damage to the structure of the tower. The last few feet at the tips of the wings did not even break through the exterior columns.

Was the airplane shredded?

Figure 4-2 shows that after the airplane broke through the exterior columns the fuselage was so large that it directly hit the edge of at least one floor. If the plane was slightly higher or lower than the diagram shows, or if the plane was tilted up or down, then the fuselage encountered two floors. The airplane is dimensionally accurate in these diagrams, and the objects and people inside the tower show the sizes of people and office furniture.

*** Roberto Rabanne? ***

Figure 4-1 *The hole created by the airplane in the North Tower. The red arrows show people who were walking around in the area where 10,000 gallons of jet fuel were supposedly burning. The fire was not hot enough to kill people, but we are supposed to believe it was hot enough to cause the towers to disintegrate.*

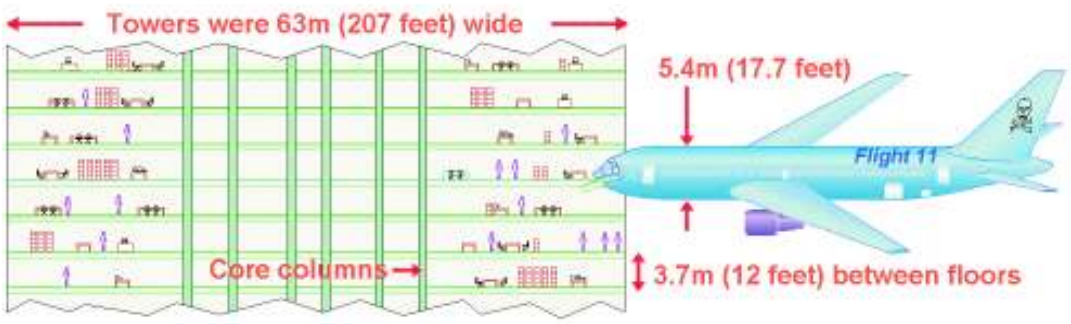


Figure 4-2 *The plane is horizontal (in the front to rear axis) in this diagram, but nobody knows its exact angle when it crashed. Normally an airplane is tilted slightly upward when flying.*

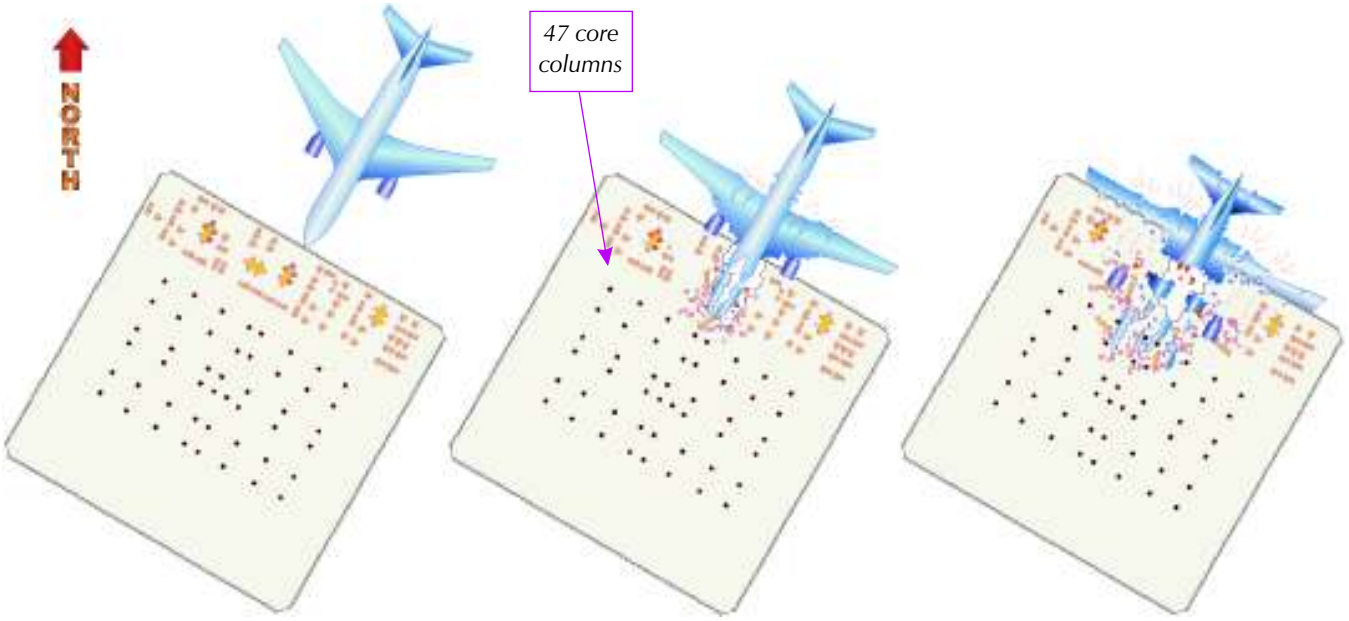


Figure 4-4 *The crash at the North Tower. The plane probably pushed fuel and debris towards the other side of the tower. Much of the debris would get trapped in the array of core columns.*

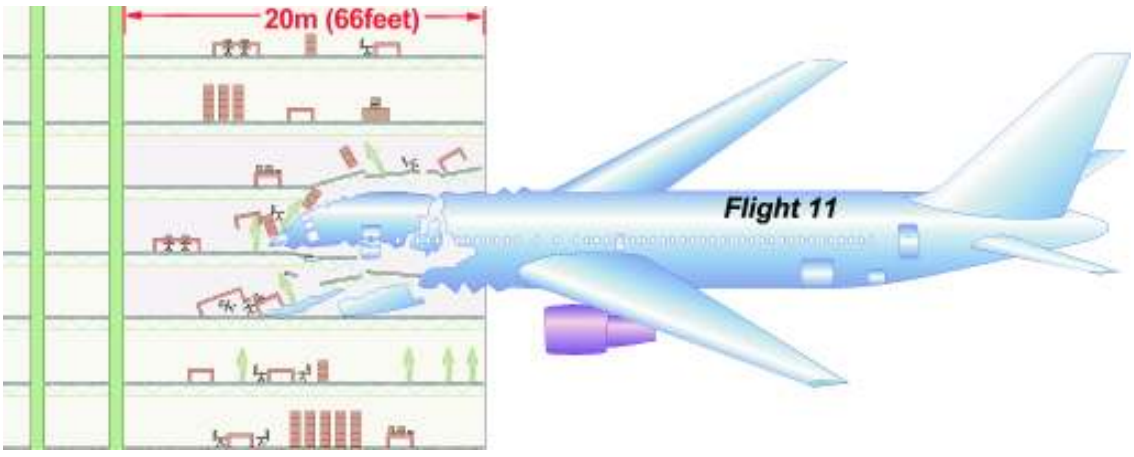


Figure 4-3 *The plane may have been torn into pieces, rather than holding together like a bullet.*

The airplane was essentially a hollow aluminum bullet with a thin wall, and it was traveling at a low speed (low for a bullet). The floors were grids of steel, topped with a 100mm layer of concrete in a corrugated steel pan. The concrete was 125mm thick around the core columns. What happened when the airplane crashed into such large and sturdy floors? Was the plane sliced into a few large pieces? Or was it shredded into *thousands* of pieces? Or did the airplane tear a hole in several floors and then come to rest inside the tower in almost one large piece, as bullets often remain in one piece?

Nobody will ever know what happened, but one of the landing wheel assemblies flew out the other side of the North Tower and ended up several streets away, with the rubber tire still clinging to the wheel. This shows that at least one piece of the airplane was torn off and passed though the maze of core columns, elevator shafts, and office furnishings. Since one piece tore off, we can assume other parts also tore off but never made it out the other side of the tower.

Figures 4-3 and 4-4 show my speculation in which the airplane was shredded into pieces in the North Tower, and Figure 4-5 shows the South Tower. I base my assumptions on other airplane crashes. Bullets are often recovered in one piece, but it is more common for airplanes to rip into pieces when they crash.

The plane swept flammable material to the core

The area between the core columns was mainly elevator shafts, with a few stairways, hallways, and maintenance rooms. Not much flammable material was in the core area. However, the plane would act as a broom by sweeping the broken flooring, office furnishings, and pieces of aircraft towards the core. Some of the debris passed through the array of core columns to the other side of the tower, and a landing wheel flew out of the tower, but a lot of the debris must have been caught in the array of columns. Some of this debris was flammable, so the center of the tower may have been provided with a lot of fuel, in addition to the jet fuel that was sprayed in the area.

Did the airplane destroy any of the core columns?

It is possible that most of the fuselage was shredded as it passed through 20 meters of flooring. By the time the pieces made it to the core columns, they may not have had enough kinetic energy remaining to do any significant damage. For all we know, the airplane did not actually break or bend any of the core columns. In such a case, the collapse of the tower would not have been due to damage of the core columns.

It is also possible that the airplane was sliced into halves, and the bottom half, which had the thickest metal components, slid across the floor, slammed into some of the core columns at high speed, and destroyed several of them. In that case the destruction of those core columns may have played a significant role in the collapse.

Since nobody inspected the rubble, nobody knows how many core columns – if any – were damaged by the airplane. This shows one of the reasons we have laws requiring that the rubble from such disasters be saved for scientific analyses.

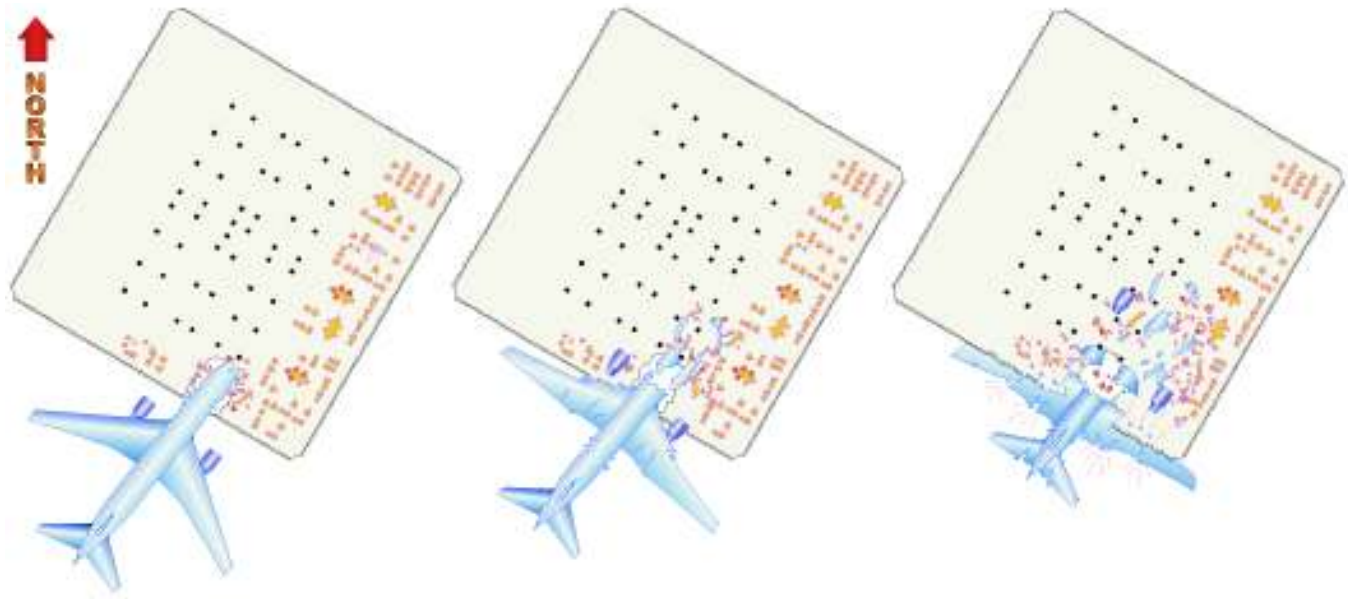


Figure 4-5 *The crash at the South Tower. The airplane pushed debris and fuel to the northeast corner. Not many core columns would have been damaged.*

The North Tower survived the crash

The North Tower was quiet, stable, and motionless within a few dozen seconds after the plane crash. I am not aware of anybody making remarks about loud, creaking noises coming from the steel beams within the tower. Nor did anybody make remarks about loud noises caused by concrete floors breaking apart and falling down on the floors below it. The only noise was from the fire. There was no indication that the tower was in danger of collapsing. It appears that the airplane crash did not do enough damage by itself to cause the collapse. This would indicate that the collapse was due to the fires.

The South Tower is hit by an airplane

Flight 175 crashed into the South Tower at 9:03 AM, hitting between floors 78 and 84. This was 16 minutes after the North Tower was hit. This airplane hit near the edge of the tower at some unknown angle.

Figure 4-5 shows my speculation of what happened inside the tower. Photographs of the hole created by the plane show the point of impact, but photos do not show the exact angle of the plane, so the angle is my speculation. The diagram is merely to show what may have happened after the plane entered the tower.

The diagram shows the body of the airplane hitting two of the 47 core columns, but it is possible that the airplane hit only 1 column, or 7 columns, and it may have missed all columns. FEMA believes it "probable" that the airplane hit at least one column, but nobody knows for certain.

Regardless of the angle the plane hit, one of the engines entered the core area and may have damaged a core column. However, most of the aircraft entered the tower at a location where there were no core columns in its path, so there was nothing to stop the pieces from flying through the office area. One engine and a piece of landing gear flew through the tower and came to rest several streets away. A portion of the fuselage (a piece with several passenger windows) flew through the tower and landed on top of Building 5.

The pieces of the airplane probably pushed office furnishings towards the northeast windows, as well as push flammable material into the core area. Jet fuel must have sprayed into the core area, also.

Figure 4-6 *The fireball at the North Tower from the plane crash*

The Fireballs

The North Tower fireball

Some people assume the plane injected the North Tower with its full load of fuel, thereby creating an incredibly intense fire. However, a video taken at the time of the crash shows that a large amount of fuel burned outside of the tower. Figure 4-6 is a frame from that video. FEMA believes all the fuel entered the tower but some of it was blown out when it caught on fire inside the tower. Regardless of how the fireball was created, the photos show that some fuel did not contribute to the fires inside. It is also possible that some fuel went into elevator shafts and stairways, where it would not do much damage to the tower. Furthermore, the video shows a small fireball at the opposite side of the tower, which means some fuel passed through the tower.

The South Tower fireballs

This plane created two fireballs (or three, depending on how you count them). The smaller one was at the location where the plane hit the tower, and it was similar in size to the fireball at the North Tower. This would indicate that both fireballs consumed similar quantities of fuel.

The second fireball was along the "side" and "rear" of the tower. It actually began as two separate fireballs but quickly merged into one large fireball. Figure 4-7 shows the two fireballs after they merged.

How much fuel was lost in the fireballs?

FEMA does not go into much detail about the fireballs. Instead they assume each plane contained 10,000 gallons of fuel, and that all of the fireballs consumed perhaps 3,000 of the 20,000 total gallons. They do not bother to speculate on how much fuel remained in the South Tower, but their figures imply that an enormous amount of fuel remained inside both towers.

Despite the loss of fuel in fireballs, and despite any fuel lost down elevator shafts and stairways, an enormous amount of fuel remained inside the North Tower. This would create a fire much more severe than an office building normally experiences. Not surprisingly, photos of the North tower show fires and large quantities of smoke on several floors (Figure 4-8 is one example). People above the fire zone were jumping out of windows because the smoke was so thick and the fire so extensive that they could not use the stairways to get below the fire zone or up to the roof. It would appear as if the fires in the North Tower could support the theory that the fire damaged the structure of the tower, thereby contributing to or causing its collapse.

However, the situation with the South Tower was significantly different. Even if most of the fuel remained inside the South Tower, as the FEMA report suggests, photographs show that the fire never spread beyond a small section of the crash zone. The fires remained on one side of the tower, and only on a few floors. Compared to the fires in the North Tower, these were small fires. Rather than jump out of the windows, some of the people in the South Tower who were above the fire walked down the stairs. The fire was not their problem; rather, smoke and darkness was their problem.

The Raging Fires

Most experts believe fire caused both towers to collapse, but the fire in the South Tower does not appear to be any worse than hundreds of other fires in office buildings. Could such a small fire cause the South Tower to collapse when so many other office buildings survived fires that spanned more floors and which burned for a longer period of time? Or was the fire worse than it appears from the outside?

The North Tower fires were severe, but were they severe enough to destroy the tower?

AP/Wide World Photo

Figure 4-7 *The South Tower fireball. The plane came in from the left side of this photo. The red arrow points to the Black Hole in the North Tower created by the airplane crash.*

The fires could melt aluminum?

Aluminum melts at 660°C. If FEMA's temperature estimates are correct, the interiors of the towers were *furnaces* capable of casting aluminum and glazing pottery; they were not ordinary office fires. From the FEMA report:

> *The modeling also suggests ceiling gas temperatures of 1,000°C (1,800°F), with an estimated confidence of plus or minus 100°C (200°F) or about 900–1,100°C (1,600–2,000°F).*

> *Temperatures may have been as high as 900–1,100°C (1,700–2,000°F) in some areas and 400–800°C (800–1,500°F) in others.*

Did the fires produce enough heat?

While the experts may be correct that the fire reached 1,100°C, a fire will not damage a building unless it can produce enough *heat*. Consider the difference between an

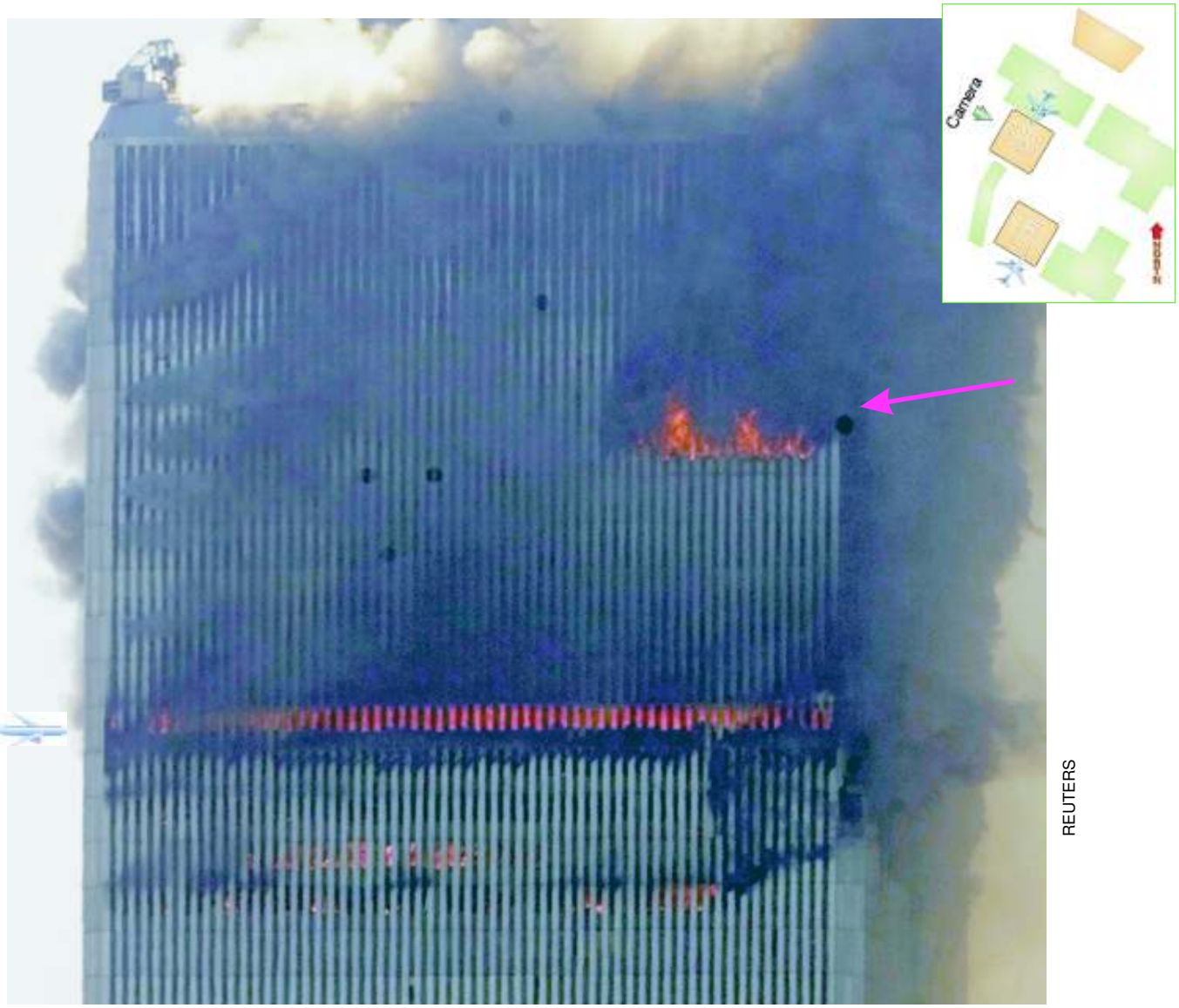


Figure 4-8 *The North Tower. The tiny airplane indicates the location of the crash and the direction the plane was traveling. The plane pushed debris and fuel to the other side of the tower (towards the right, in this view). This may be why the fires seem more extreme towards the right side. The red arrow points to the largest flames in the North Tower, but it is 6 or 7 floors above the crash zone. Why isn't the crash zone burning like that? Where are the flames from the 10,000 gallons of jet fuel?*

electric toaster and an electric light bulb to understand the difference between heat and temperature. Both devices send electricity through a metal filament in order to raise the temperature of that filament. The difference between them is that a lightbulb produces an extremely *high temperature*, whereas a toaster produces *a lot of heat*.

It is possible for a lightbulb to produce as much heat as a toaster if the lightbulb is very large or if 50 light bulbs are turned on at the same time. This shows that the quantity of heat can be increased simply by adding more sources of the heat. However, the temperature cannot be increased simply by adding more sources of the temperature. For example, a very large toaster will *not* produce the same high temperature as a lightbulb, nor will turning 50 toasters on at the same time produce the same high temperature as one tiny lightbulb.

The temperature of the fire in the World Trade Center was due to the chemical process involved in the oxidation of hydrogen and carbon. That chemical process occurs at a certain temperature regardless of how much fuel is burning. Increasing the quantity of fuel will *not* increase the temperature of that chemical process; rather, it will only increase the amount of heat that is being created. The only thing that affects the temperature of a fire is the material that is burning. For example, carbon produces a higher temperature than hydrogen.

The experts claim the fire raised the temperature of the steel to 340°C or higher. While the burning of hydrogen and carbon will produce temperatures that high, raising the temperature of dozens of massive steel beams to 340°C requires a lot of heat be produced for a long period of time. Consider a lightbulb to understand this concept. A lightbulb produces temperatures that are beyond the melting point of steel, but none of the steel beams melted when employees inside the World Trade Center turned on light bulbs. The reason is that a lightbulb does not produce much heat. A lightbulb does not even produce enough heat to melt itself.

On the morning of September 11th employees in the North Tower turned on hundreds of light bulbs on almost every floor. The filaments and plasmas in those bulbs produced temperatures of thousands of degrees, just as if they were tiny, extremely high-temperature fires. Those bulbs caused the temperature inside the tower to increase, exactly as fires raise the temperature. However, none of the steel inside the tower became weak from those high-temperature bulbs. The reason is that the bulbs did *not produce enough heat*.

The burning of jet fuel, office furniture, and carpeting will produce flames that have a temperature above 340°C. However, *the temperature of the flames is irrelevant*. The plasma in a fluorescent bulb is at a temperature beyond the melting point of every object in the universe, but none of that plasma has vaporized any of us yet. Likewise, the temperature of the flames in the World Trade Center is meaningless. The important issues are:

1) **How much heat** was generated.
2) For **how long of a period of time** was the heat in contact with the steel.

The burning of *one* office desk would *not* have damaged the structure of the North Tower. The tower was so massive that the burning of *two* office desks would not be able to weaken its structure, either, even if some carpeting and paper was also burned. In order for the steel structure to become 340°C, the fire would have to produce thousands of times as much heat as all the light bulbs, computer monitors, coffee makers, and microwave ovens that were turned on each day.

Another way to look at this issue is to consider that the burning of an office desk is equivalent to turning on a certain number of coffee machines or light bulbs. For example, the burning of a typical desk may be equivalent to turning on 60 computers for one hour. This makes it easy to realize that a lot more than one office desk must burn in order for a fire to damage a steel building. The burning of jet fuel is equivalent to brewing pots of coffee.

A possible reason some people are confused by these issues is that they assume a fire that is dangerous to people is also damaging to steel. The people who jumped out of the North Tower created the illusion that the fire was extreme, but people can be devastated by the smoke from a tiny fire of burning plastic, and temperatures of boiling water kill us quickly. However, an office fire would have to be phenomenal to damage thick steel beams.

Did the fires have enough time?

Let's assume there was enough jet fuel to completely melt the entire tower. Unfortunately, heat will not affect an object unless it is applied for a certain amount of *time*. You can see this effect if you have a stove that burns gas. The flames in a stove are much hotter than the fires of the North Tower because a stove mixes the fuel and air in perfect proportions, but you can safely pass your fingers through those hot flames if you move them quickly.

A lot of jet fuel was mixed with air when the planes crashed into the towers, and an enormous amount of heat was generated when it burned. However, that jet fuel burned so rapidly that it was just a momentary blast of hot air. The blast would have set fire to flammable objects, killed people, and broken windows, but it could not have raised the temperature of a massive steel structure by a significant amount. A fire will not affect steel unless the steel is exposed to it for a long enough period of time for the heat to penetrate. The more massive the steel beams are, the more time that is needed.

The South Tower fire was smaller and had less time

The airplane hit about 15 floors lower in the South Tower. The structural columns were thicker at this location, so the fire in the South Tower had to produce *more heat* than the fire in the North Tower in order to raise the columns to the *same temperature* as in the North Tower. However, the fires in the South Tower were *smaller*. Furthermore, the South Tower collapsed after the fires burned for only 56 minutes, whereas the North Tower fires burned for 103 minutes.

How did the small fires cause the South Tower to collapse in only 56 minutes while more intense fires in the North Tower burned for twice as long in an area where the steel was thinner? Also consider the 1991 Meridian Plaza fire in Philadelphia. That fire was so extreme that flames came out of dozens of windows on many floors, and it burned for 19 hours. The building was damaged, but it never collapsed.

Fire has *never* caused a steel building to collapse, so how did a 56 minute fire bring down a steel building as strong as the South Tower? It takes more than 56 minutes to cook a turkey. Only an incredible fire could destroy such a massive steel structure in 56 minutes. This implies that either the fire was indeed incredible but I am too much of a dimwit to realize it, or the fire had only a small effect on the collapse, if it had any effect at all.

Did any of the fireproofing function?

Both the core and exterior columns were protected with fireproofing materials. The airplanes certainly destroyed some of the fireproofing, but some columns would have retained all or most of their fireproofing. Also, gypsum drywall provides a small amount of fireproofing, and it was used throughout the tower. The fireproofing materials supposedly provide one or two hours of protection during "normal" fires. Although these were not normal fires, the fireproofing should have protected the South Tower from a 56 minute fire.

Since the North Tower fire burned for only 103 minutes, the columns that retained their fireproofing should have been protected to some extent. Only the few columns that were stripped of their fireproofing could possibly have reached a significant temperature from such a short-duration fire. The fire would have to be both high in temperature *and* producing an extremely large amount of heat in order to get through the fireproofing material in less than two hours.

Did the fires have enough fuel?

People on the ground smelled jet fuel because some of it never burned. Of the fuel that burned, a lot of soot was produced because of the lack of oxygen, which means some of its energy was wasted. It also seems that much of the jet fuel burned up within a few minutes. This means that if the steel reached high temperatures, the heat had to come from the jet fuel that survived beyond the first few minutes, such as the fuel that soaked into carpeting and other items, and from the burning of office furnishings and airplane parts. Was there enough flammable material available to the fire to destroy the tower?

The companies that rented space in those towers could certainly come up with an estimate of the quantity of flammable material in the crash zone, and that would allow physicists to determine if there was enough energy in those objects to heat the steel structure to 340°C. It is possible that there was not enough jet fuel, wooden desks, computers, and other flammable objects in the crash zone to raise the temperature of the structure to even 120°C.

The debris suppressed the fire

As seen in Figures 4-3 and 4-5, a lot of debris from the broken flooring may have been pushed into the core area. Each airplane also added perhaps 80 tons of metal and glass to the inside of the towers. This large amount of nonflammable debris would significantly hurt the fires by interfering with the flow of air. For all we know, some of the hallways in the core had been packed so tight with debris that air barely moved through the area.

The debris would also absorb some of the heat from the fire, which would reduce the amount of heat available for the steel structure. If there were only a few tons of debris, it would be insignificant, but there was about 80 tons of nonflammable aircraft pieces, and perhaps many tons of broken flooring. The enormous quantity of aluminum would be an efficient heat sink, and the flooring pieces would absorb some heat, also.

Some people believe that the fire was producing so much heat that aluminum had melted. However, in order to melt a significant quantity of aluminum, the debris touching that aluminum would have to heat up to the same high temperature. This requires the fire to produce even more heat than would be necessary to melt only the aluminum.

Furthermore, if some of the heat from the fire was going towards the melting of aluminum, that means some of the heat was *not* going towards raising the temperature of the steel structure. Therefore, anybody who promotes the theory that aluminum was melting must explain how the fire could produce so much heat that it could both melt aluminum *and* raise the temperature of tons of debris, *and* still have enough heat remaining to raise the temperature of the steel structure. Where did this enormous quantity of heat come from? From the burning of a few dozen office desks, some carpeting, and some office papers? Many people believe that the jet fuel provided most of the necessary energy, but if the jet fuel was

burning, where are the flames? Where is the light from the fire? How can 10,000 gallons of jet fuel burn without flames?

Why did the flames vanish so quickly?

The jet fuel created spectacular fireballs when the airplanes crashed, but within a few minutes most of the flames had vanished. Compared to the Meridian Plaza fire and other office fires, the fires in the towers had very few flames. Was the fire so deep inside the tower that the flames could not be seen?

The lack of flames is an indication that the fires were small, and the dark smoke is an indication that the fires were suffocating. The experts believe the fire was producing so much heat that it weakened the structure of the tower. However, the soot and lack of flames can be used as evidence that the fires were suffering from such a lack of oxygen that they were not capable of damaging such a massive steel structure.

The World Trade Center's "Black Holes"

Figure 4-1 (page 27) shows a close-up of the hole in the North Tower. While the photographer was far away and using a telephoto lens (which causes a fuzzy image), it lets us look into the tower to see what was happening in the crash zone. It lets us see how many of the concrete floors were broken, and how severe the fire was. Unfortunately, the hole is black, not brightly colored with flames of a fire. We cannot see inside the hole.

The photograph in Figure 4-9 was taken before the South Tower was hit, so it was less than 16 minutes after the airplane crashed into the North Tower, but the hole is black in that photo, also. Furthermore, every other photograph of the hole shows it to be black. There are only a few flames in few windows.

Figure 4-8 (page 32) shows a different side of the tower. Although a few flames are visible along one floor, most of the tower is dark. Could those fires be capable of melting aluminum and heating dozens of massive steel beams to 340°C or higher? Or was the fire raging in the center of the tower where we cannot see it?

When I first saw the Black Holes I dismissed them as the result of amateurs with inexpensive, automatic cameras. Figure 4-9 is an example. The image is tilted, blurry, and the photo was posted on the Internet without any identification of the photographer. This photo would bring me to the conclusion that the Black Hole was due to the lousy camera and the lousy photographer.

When I began putting this book together I started searching for the source of the photographs and I discovered that many are from professionals. However, the professional photographs do not show any more flames than the amateur photographs, and the holes are just as black. It is unlikely that every professional photographer made the same mistake in his aperture settings. These black holes, therefore, should not be dismissed as goofs by the photographer. There is a reason these holes are black; the reason is there is *no fire near the hole.*

Another interesting thing to notice in these photos is that a breeze is blowing towards the hole. This would provide oxygen to the fire in the hole, which would allow the fire near the hole to burn better compared to the fires deep inside the tower. However, there is no sign of fire at this location. Since the fire was insignificant where oxygen is plentiful, what are the chances that a severe fire was burning around the core columns, where the smoke should be much thicker and where debris may have reduced the flow of air?

Flames can be seen along some windows, but not inside the tower. This could be a sign that the only significant fires were the ones next to broken windows. The fires deep inside the tower may have been barely surviving.

Figure 4-9 *The South Tower has not been hit, so this Black Hole developed in less than 16 minutes.*

The North Tower fires were suffocating

It is commonly known that a fire can be extinguished by spraying it with water or certain chemicals, but it is not commonly known that an excellent method of suppressing a fire is to shut all the windows and doors to reduce oxygen and cause the smoke to accumulate. Another method of suppressing a fire is to dump nonflammable material on it, such as dirt, broken glass, and scraps of metal. The fire in the North Tower was suppressed in both ways:

- **Debris**. The aircraft dumped 80 tons of nonflammable aircraft pieces into the crash zone, and it busted some of the flooring into pieces, which created more nonflammable debris. This enormous quantity of debris must have absorbed significant amounts of heat, and it would have interfered with the flow of air.

- **Sealed windows.** The windows were sealed shut, so the only oxygen available to the fire was whatever blew in from the few broken windows and the hole created by the airplane. Some air would also have passed through the elevator shafts and stairways. There was obviously enough air flowing to keep a fire burning, but was there enough of a flow to maintain a fire so incredible that it could cause a steel structure to crumble?

The dark smoke and lack of flames is an indication that the fires did not have enough oxygen to burn properly. There were flames along some windows, but deep inside the North Tower, where the core columns were, the fire may have been barely surviving its own smoke, *if it was burning in the core at all*. For all we know, the fire in the core area was extinguished after ten minutes.

Where was the red light?

In an area that was not full of jet fuel there would be only a few scattered fires (Figure 4-10). In this diagram the air is cool because the fire has just started.

The smoke from the fire would cool down quickly as it spread along the ceiling because it would transfer its heat to the air and the ceiling. Items low to the floor, such as desks, would not be affected by the fire because they would be in the zone of cooler air. The steel columns would not be affected by the fire, either, because the smoke would be cool by the time it reached them. The columns that had been sprayed with jet fuel would be in close contact with high temperature flames, but even in that situation the hot flames would rise to the ceiling. My point is that the *air* and the *ceiling* would reach high temperatures before the columns.

As the air continued to heat up, items lower to the floor would eventually catch on fire, as illustrated by the burning computer (Figure 4-11). Flames would appear at more windows. Every flammable object would eventually catch on fire. Therefore, photos should show the fires *spreading throughout the entire floor*. However, only one floor in North Tower appeared completely on fire (Figure 4-8). The fires on the other floors did not spread throughout the floor, nor were flames visible in many windows. Rather, the flames diminished over time. This implies the air temperature on all but one floor of the North Tower was *below the ignition temperature of plastic and paper*. Therefore, only the columns in that one floor are likely to have reached high temperatures.

As the fires continued to burn, the air along the ceiling would eventually be hot enough to roast the tops of the windows while the bottom of the windows remained considerably cooler. Since most windows are made of an inexpensive glass that cannot resist uneven temperature changes, windows tend to shatter from fires. Therefore, photos should show windows shattering as time passed. Photos do indeed show broken windows on many floors, but some of those windows broke from the airplane crash or the blast created by the fireballs. Some were also broken by people in a desperate attempt to get fresh air.

Only one floor of the North Tower shows signs of reaching a significant temperature. The tower was so tall that photos do not clearly show the windows of the crash zone, so it is possible that many of the windows along that floor (Figure 4-8) were shattered by the fire. However, photos of the front of that floor (e.g., Figure 4-1) do not show signs of windows shattered from high temperatures. Since the fire could not even crack the glass through the entire floor, and flames cannot be seen in the hole, how could the fire have produced enough heat to cause a steel structure to crumble?

If FEMA's 1,000°C estimate is anywhere near correct, all aluminum objects near the ceiling would have melted, and so would many aircraft pieces. Pottery furnaces operate at that temperature. There should have been pools of molten aluminum inside the towers. However, if the fire did not have enough time to melt aluminum, or if the fire did not produce enough heat to melt aluminum, how did the fire have enough time and heat to raise the temperature of the thick steel columns to such an extreme that the tower crumbled?

Finally, objects at 1,000°C glow such a bright red that the red light is clearly visible in sunlight, and they produce enormous amounts of infrared radiation (heat). Therefore, photos should show the ceiling glowing red, and the infrared radiation would roast everything in the area. Since each ceiling was also a floor, fires should break out on the floors above. So why does the inside of the tower appear black instead of red? How can such extreme temperatures be so invisible? Why didn't the fire spread to other floors?

FEMA's estimate of 1,000°C at the ceiling may be correct for the first few seconds when the jet fuel ignited, but there is

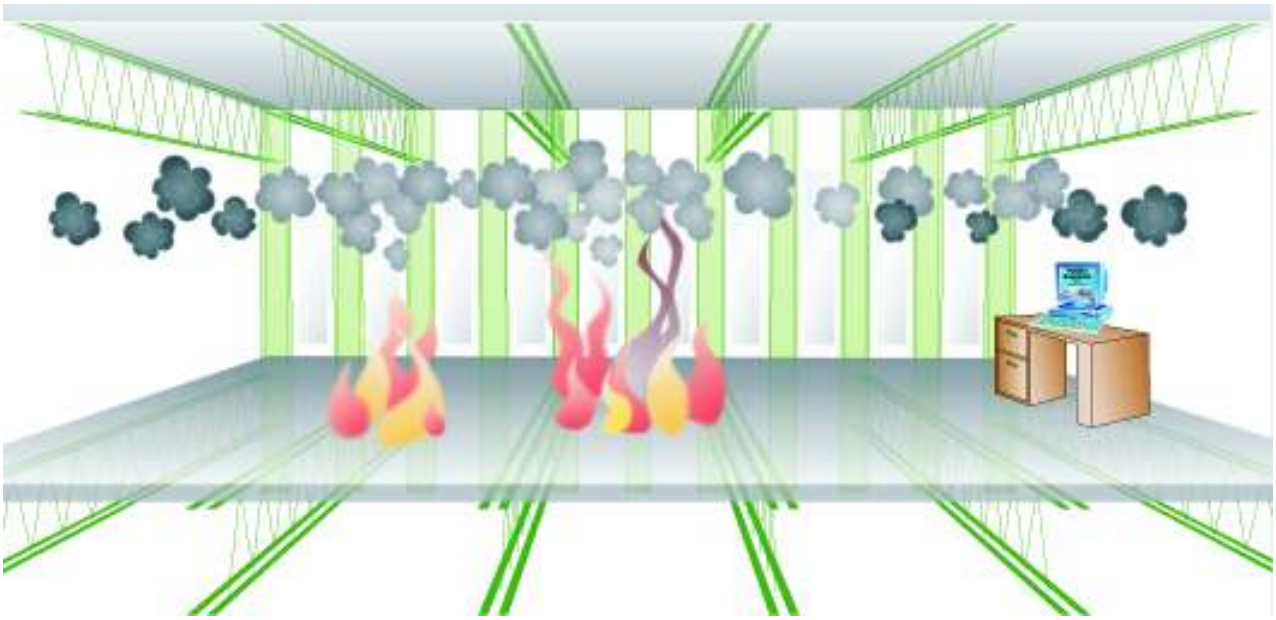


Figure 4-10 *Everything in the room was cool when the fires started. The hot smoke cooled down quickly as it warmed the air and ceiling. Objects near the floor remained cool. (The cool temperature of the smoke is illustrated with a dark color.)*

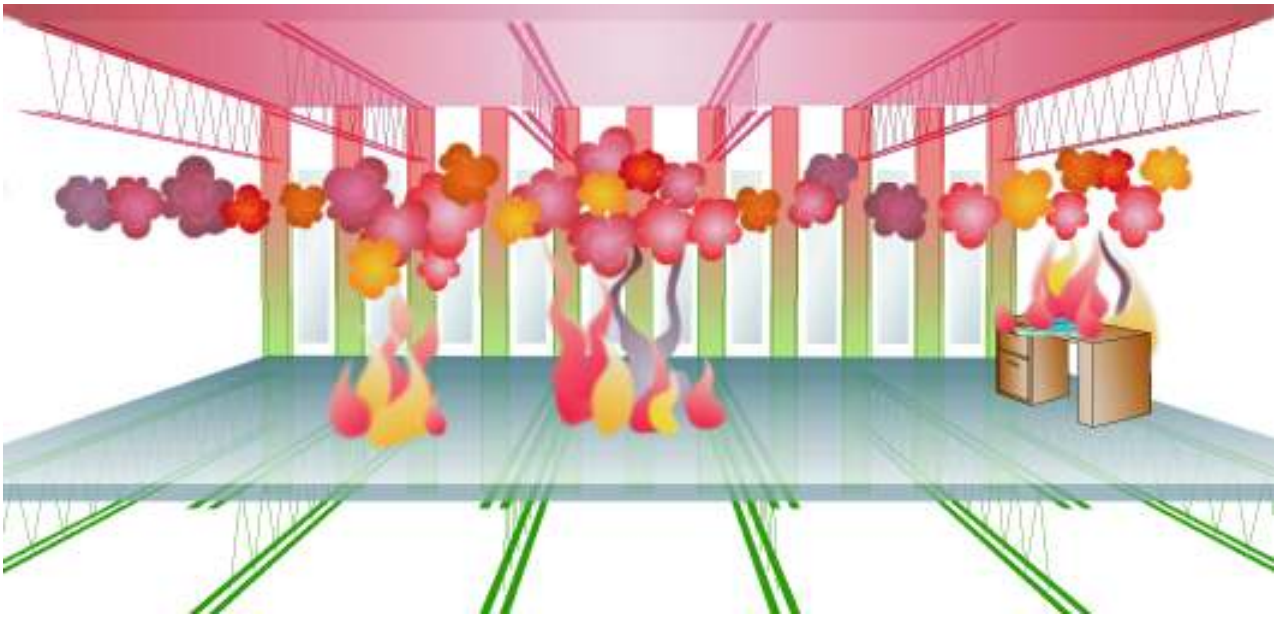


Figure 4-11 *Over time the temperature of the air in the crash zone would increase, and so would the ceiling.* ***The fire should spread as a result.***

From the FEMA report: "The modeling also suggests ceiling gas temperatures of 1,000°C (1,800°F)."
Such a high temperature would melt aluminum and cause everything to ***glow a bright red that is visible in sunlight.*** *Why didn't the windows shatter from such an intense fire? Why don't photos show any of the red light?*

no evidence that such high temperatures persisted for any significant period of time. There is not even any evidence to support the estimates of 600°C.

The exterior columns remained cool

A significant amount of the strength in the towers came from the exterior columns. Considering that only one of their four sides was in contact with the inside of the tower, and considering that the fires near the windows were small, it is unlikely that the exterior columns could have reached a high temperature. This means that the exterior columns would have retained their strength throughout the fire. This in turn means the breaking of the exterior columns cannot be blamed on the fire.

The South Tower fires seem insignificant

Photos of the South Tower show fires that are much less intense than those of the North Tower. Despite this, FEMA suggests the possibility that something melted:

> *This videotape suggests that, in the minutes immediately preceding the collapse, the most intensive fires occurred along the north face of the building, near the 80th floor level. Just prior to the collapse, a stream of molten material—possibly aluminum from the airliner— was seen streaming out of a window opening at the northeast corner at approximately this level.*

The video that FEMA refers to was taken at the offices of Skidmore, Owings & Merrill LLP (SOM) at 14 Wall Street, which is just a few blocks away from the South Tower. FEMA was allowed to view this video, but when I sent an e-mail request to SOM to buy a copy of the tape, the curt response was:

> *We need to know for what is it going to be used.*

I never heard from them again. Why the secrecy for a video that supports our government's theory that a fire caused the collapse?

FEMA says the molten material came out of the *northeast corner* of the tower. As Figure 4-5 shows, the airplane swept a lot debris to the northeast corner, including lots of airplane pieces. There would be plenty of aluminum in the area to melt, but I do not see any evidence in the photos of a fire capable of melting visible quantities of aluminum. However, there would be more than 2,300 kilograms of human body parts in that corner from both the airline passengers and the office workers. Their body fluids and fat could explain FEMA's "stream of molten material," and it would explain why the video is a secret.

Why didn't fires spread in the South Tower?

In order for the fires in the South Tower to heat the core columns to a significant temperature, a lot of hot gas from the fire had to travel along the ceiling to the core columns. Since the columns were thick, the flow of hot gas would have to continue for some period of time. However, a large flow of hot gas would set fire to everything flammable in the ceiling (such as the plastic of electrical wires, lights, and cables). The hot gas would eventually set fire to papers and other objects that were near the ceiling, and later it would set fire to items lower to the floor, such as the plastic in computers monitors (Figure 4-11).

Photographs of the South Tower should show the fire spreading throughout the area as time passed. However, photos show the spectacular flames vanished quickly, and then the fire remained restricted to one area of the tower. Rather than spreading throughout the area, the fires slowly diminished. How could a fire produce such incredible quantities of heat that it could destroy a steel building, while at the same time it is incapable of spreading beyond its initial starting location? The photos show that *not even one floor* in the South Tower was above the ignition temperature of plastic and paper!

Why didn't the windows around the crash zone break from this incredible fire? The photos show the fire was not even powerful enough to crack glass!

Why do photos show only sooty smoke and black holes, such as Figure 4-12? Why is there no evidence of an intense fire in *any* photograph? How can anybody claim the fires were the reason the South Tower collapsed when the fires appear so small?

Fire has *never* caused a collapse

The fire in the office building at One Meridian Plaza in Philadelphia in 1991 was so intense that it damaged the structure of the building. As FEMA's 1991 report describes it:

> *After the fire, there was evident significant structural damage to horizontal steel members and floor sections on most of the fire damaged floors. Beams and girders sagged and twisted —some as much as three feet —under severe fire exposures, and fissures developed in the reinforced concrete floor assemblies in many places. Despite this extraordinary exposure, the columns continued to support their loads without obvious damage.*

The Meridian Plaza fire was extreme, but it did not cause the building to collapse. The fire in the South Tower seems insignificant by comparison to both the Meridian Plaza fire and the fire in the North Tower. How could the tiny fire in the South Tower cause the entire structure to shatter into dust after 56 minutes while much more extreme fires did not cause the Meridian Plaza building to even crack into two pieces? And why did the North Tower handle a larger fire for twice as long?

There is no support for the "Hot Fire Theory"

The most popular theory is that fire destroyed the towers by weakening the steel with high temperatures. The point of this chapter is that the fires seem too insignificant to support such a theory.

Many people believe the fire destroyed the towers when the naked steel beams were exposed directly to intensely hot flames. First, the columns were not naked. Rather, most of them were protected against such small, short duration fires. Figure 4-5 shows that flying debris in the South Tower may have destroyed some of the fireproofing around some core

Figure 4-12 *This photograph was taken slightly before the one in Figure 4-7. There are only a few flames in the North Tower, and the smoke is very dark. The fires have been burning for only 16 minutes but already most flames have vanished. Why didn't the fire grow over time?*

columns, but most columns certainly retained all of their fireproofing. Therefore, only a few core columns are likely to have become warm from a 56 minute fire.

Second, the fires were not producing much heat. Even if every core column had been stripped of its fireproofing, massive steel columns will not reach high temperatures in only 56 minutes from fires that are incapable of spreading to other flammable office furnishings. If the fires were capable of raising steel beams to a high temperature, the fires would have also raised the computers, wooden desks, and other flammable materials to high temperatures, which would have caused fires to spread throughout the floor.

The sooty smoke and the black holes in the towers cannot be dismissed as interesting aspects of the fires, nor as problems with the photography. Rather, they are signs that the air flow was so restricted that the only significant fires were near broken windows. The fires in both towers were probably coating the columns with soot rather than heating the columns to a high temperature.

It does not appear that the fire in *either* tower was capable of raising the temperature of the core or exterior columns to a high enough temperature to cause the steel to lose strength. The flames are nearly invisible even when a photo is brightened (Figure 4-13).

Damage from thermal expansion is possible

Thermal expansion is a serious problem for many products. Bridges, sidewalks, and buildings are designed to cope with it, but only to a certain extent. If some steel beams in the towers increased to 90 or 140°C they would not have lost any strength, but they would have expanded, which would cause them to push against other beams. If they expanded more than the structure was capable of dealing with, then the fire would have damaged the structure.

Thermal expansion can cause a structure to break into pieces but, as the next chapter shows, the towers shattered into dust rather than cracking into pieces. Therefore, the *Collapse by Thermal Expansion* theory seems unlikely.

AP/Wide World Photo

Figure 4-13 *The North Tower 30 seconds before it collapsed. The only serious fire is the same fire the red arrow points to in Figure 4-8. This fire is high above the crash zone, and only in one small section of that floor. The crash zone is darker than it ever was, and I brightened the image to make the flames more visible.*