Building a Better Mirage

NIST's 3-Year $20,000,000 Cover-Up of the Crime of the Century

by Jim Hoffman
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a critique of the
Final Report of the National Construction Safety Team
on the Collapses of the World Trade Center Towers
by the Federal Building and Fire Safety Investigation
of the World Trade Center Disaster

revision history
8/01/05: 911Research publishes Version 0.9 of this critique
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NOTE: Pre-1.0 versions of this essay critiqued the Draft of NIST's Final Report.
Version 1 includes the new section NIST's Vacuous Response to its Critics.

Introduction

On June 23, 2005 the National Institute for Standards and Technology (NIST) published the draft of its 'Final Report of the National Construction Safety Team on the Collapses of the World Trade Center Towers' (document NISTNCSTAR1Draft.pdf), and in September it released its Final Report (document NISTNCSTAR1CollapseofTowers.pdf). This Report and a separate one on the case of WTC 7 represent the culmination of NIST's three-year investigation of the collapses of the three World Trade Center skyscrapers, funded with an initial budget of $16 million and subsequent appropriations from taxpayers' money.

NIST's investigation is often cited as proving the official theory that the plane crashes and fires caused the collapses. Yet the Report does not explain why or how the buildings totally collapsed, despite the lack of a single historical precedent for a steel-framed skyscraper totally collapsing for any reason other than controlled demolition. And, in contrast to the Report's voluminous detail about the plane crashes, fires, and loss of life, it makes no attempt to characterize or explain the demolition-like features of the collapses -- such as their explosiveness, pulverization, verticality and nearly free-fall rapidity -- except for two sentences in a half-page section added to the Final Report to address criticisms of the Draft.

NIST simply avoids these troublesome issues by placing them outside the scope of its investigation, claiming that "global collapse" was "inevitable" after the "initiation of collapse."

This series of photographs show the North Tower at about 6, 8, and 10 seconds into its collapse. Neither NIST's Final Report, nor any of its other documents, attempts to explain the explosiveness, systematic pulverization, speed, or straight-down symmetry of the collapses. NIST shows no interest in explaining the catastrophic total collapses, blithely asserting that "global collapse" was "inevitable" following "initiation."

NIST's Theory

Remaining strictly within the confines of the officially prescribed theory, NIST crafts an explanation for the "initiation of the collapse of each Tower" that avoids faulting the Towers' construction: The aircraft impacts dislodged insulation from the steel, and the exposed steel succumbed to the fires. Sagging trusses pulled in portions of the perimeter walls, causing a rapid spread of "column instability" in perimeter columns, which in turned strained the fire-weakened core columns. The "tremendous energy" of the floors above the collapse zone led to "global collapse."

Challenges

In this critique I challenge NIST's explanation on two levels:

- Its theory about the effects of crash and fire damage is deeply flawed.
- Its presumption that "collapse initiation" will automatically lead to "global collapse" is unfounded.

Whereas the Report attempts to pre-empt challenges of the first type with the voluminous detail of its observations and models, it does not even address challenges of the second type. Yet it must have been aware of such challenges. NIST's lead investigator Shyam Sunder is extensively quoted in the *Popular Mechanics* article attacking "conspiracy theories." Respected theologian David Ray Griffin detailed evidence of controlled demolition in an April 18, 2005 address to the University of Wisconsin at Madison, which was aired twice on C-SPAN2's *BookTV*. Griffin's remarks included:

- The buildings collapsed straight down, and at virtually free-fall speed, as in controlled demolitions, and then the rubble smoldered for months.
- Many people in the buildings said that they heard or felt explosions.
- Virtually all the concrete of these enormous structures was pulverized into very fine dust.
- Much of this dust, along with pieces of steel and aluminum, was blown out horizontally several hundred feet.
- Most of the steel beams and columns came down in sections about 30 feet long, conveniently ready to be loaded on trucks.

By truncating its investigation at "collapse initiation" NIST avoids having to consider and disclose the subsequent evidence of controlled demolition.

Contents

NOTE: Excerpts from the Report are indicated by mauve backgrounds. Each reference indicates its position in the Report using both the Report page number and the PDF page number. For example (p 50/100) indicates page 50 of the Report and page 100 of the PDF document.

Passing Off "Global Collapse"

To explain the collapses of the Twin Towers, both NIST's theory of the "collapse initiation" and its supposition that "global collapse" automatically follows from such an event would have to be true. The Report simply asserts the supposition without any supporting argument, and subtly reinforces it without drawing attention to it.

- It truncates the timelines of the collapses at the point of "collapse initiation."
- It ignores the history of steel-framed buildings in regard to total collapse.
- Its numerous mentions of 'progressive collapse' conceal the fact that the Twin Towers are the only alleged examples of top-down total progressive collapse.

Circumscribing the Investigation

The Report explicitly limits its scope to the time between the jet impact and the start of the collapse of each Tower. Its abstract contains the following description:

> This is the final report on the National Institute of Standards and Technology (NIST) reconstruction of the collapses of the World Trade Center (WTC) towers, the results of an investigation conducted under the National Construction Safety Team Act. **This report describes how the aircraft impacts and subsequent fires led to the collapses of the towers after terrorists flew jet fuel laden commercial airliners into the buildings**; whether the fatalities were low or high, including an evaluation of the building evacuation and emergency response procedures; what procedures and practices were used in the design, construction, operation, and maintenance of the towers; and areas in current building and fire codes, standards, and practices that warrant revision. (p xiii/15)
> [emphasis added]

The Executive Summary is less candid about the pre-ordained conclusion of the investigation.

> Objective 1. Determine why and how WTC 1 and WTC 2 collapsed following the initial impacts of the aircraft (p xxxvii/39)

The extent of NIST's explanation for the totality of the collapses and their many demolition-like features is simply that the total collapse was "inevitable" once a collapse event was "initiated". A footnote in the Executive Summary reads:

> The focus of the Investigation was on the sequence of events from the instant of aircraft impact to the initiation of collapse for each tower. For brevity in this report, this sequence is referred to as the "probable collapse sequence," although **it includes little analysis of the structural behavior of the tower after the conditions for collapse initiation were reached and collapse became inevitable.** (p xxxvii/39)
> [emphasis added]

The footnote is a re-worded version of a paragraph in the text of the Report's Draft, which read:

> ... although **it does not actually include the structural behavior of the tower after the conditions for collapse initiation were reached and collapse became inevitable.** (p xxxvii/39 of Draft)
> [emphasis added]

That adjustment reflects the addition of a half-page section entitled "Events Following Collapse Initiation," that combines a vague rendition of the pile-driver theory with incomplete, circular, and straw-man arguments against the demolition hypothesis. The addition of this section does not change the fact that NIST did not attempt to model, or characterize in any meaningful way the collapses.

Let's pause and consider the implications of this. NIST's investigation is being presented as the presumptive last word on the collapses of the Twin Towers and Building 7. The collapse of each of the Twin Towers was the last of three events:

1. A jetliner collides with the Tower, punching a gaping hole and producing a giant fireball.
2. The jet fuel ignites fires on multiple floors, producing thick smoke and heating and possibly deforming some structures.
3. The Tower collapses totally, from top to bottom, leaving virtually no recognizable pieces except fragments of its steel skeleton and aluminum cladding.

Each event was horrific and killed hundreds of people. But only the third event violated engineering experience and required the invention of new theories to explain. Yet the Report looks only at the first two events -- the subject of hundreds of pages -- while showing no interest in the third. These are curious priorities for an investigation that purports to explain the three largest and least expected

failures of engineered steel structures in world history: the total collapses of WTC 1, 2, and 7.

Hiding Engineering History

NIST's Report gives the reader no clue of how unprecedented and unexpected the total collapses of these skyscrapers were. Rather, it suggests that total collapses of high-rise buildings are normal events, but usually happen less suddenly.

> In our cities, there has been no experience with a disaster of such magnitude, nor has there been any in which the total collapse of a high-rise building occurred so rapidly and with little warning. (p xli/43)

Indeed, buildings are normally evacuated and cordoned off before being taken down by controlled demolition, so the statement is literally true. But the Report doesn't contain the word demolition, so the statement seems crafted to mislead. In fact, there appear to be no examples of total collapse of skyscrapers anywhere in the world except through controlled demolition. There are examples of steel-framed buildings about 20 stories in height being knocked over by severe earthquakes, but large portions of earthquake-destroyed buildings remain intact. In contrast, the steel skeletons of the Twin Towers were shredded into thousands of pieces, and their non-metallic constituents and contents were pulverized into fine dust.

Severe earthquakes have caused collapses of steel-frame buildings but the buildings were not shredded into small pieces. The earthquake in Kobe, Japan, knocked buildings off their foundations (inset). In contrast the Twin Towers were thoroughly shredded, leaving a crater that smoked for over three months.

Keeping the reader in the dark about the history of steel-framed high-rise buildings is essential to passing off the notion that partial collapse automatically leads to total collapse.

Selling Progressive Collapse

The Report mentions "progressive collapse" 16 times, mostly in sections describing recommendations. It defines progressive collapse as when "a building or portion of a building collapses due to disproportionate spread of an initial local failure" but does not mention how rare the phenomenon is or that there are no examples of total progressive collapse of steel-framed buildings outside of 9/11/01.

By repeatedly invoking the specter of "progressive collapse" while concealing the phenomenon's lack

of repeatability outside of "terrorist incidents," the Report surreptitiously bolsters its supposition that "global collapse" automatically follows from "collapse initiation."

NIST's Amazing Column Failure Theory

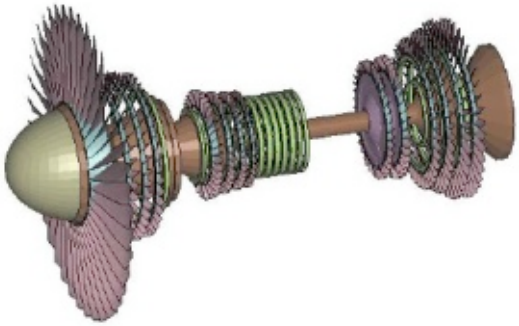
The truss failure theory was in vogue in 2002, having won the big *PBS* and *Discovery Channel* endorsements, and it eclipsed early column failure advocates. But now in 2005 the column failure theory is back, with a new advocate (NIST) sporting a $20 million budget and computer models galore.

Whereas FEMA's truss failure theory blamed the failure of column truss supports (dubbed "angle clips" by Professor Eagar) for the collapses, NIST's column failure theory blames their persistence, stating that they pulled the columns inward -- the first step in the contagious spread of "column instability."

NIST's team labored mightily to make its new theory seem plausible. Their Report:

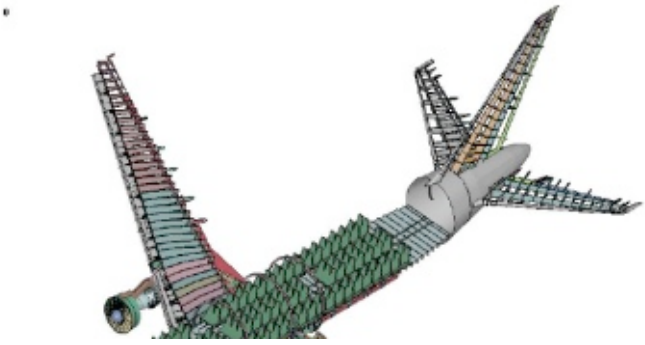
- Presents simulations of the crashing aircraft so detailed that they include the planes' turbine blades, helping the reader to overlook the lack of detail in its vague description of "column instability" leading to "global collapse."
- Mixes observation-based details with pure speculation, making it easy for the reader to miss the lack of evidence for severe core damage and high core temperatures in its models.
- Uses repetition and dramatic writing to convince the reader that steel will succumb quickly to fires.
- Exaggerates the extent and intensity of the fires, assuming temperatures more than 300 ºC (572 ºF) higher than are supported by any evidence.
- Ignores properties of steel that make it resistant to fire damage, such as its thermal conductivity.
- Asserts that perimeter columns bowed inward on the basis of their distorted appearance in certain photographs, ignoring other plausible explanations.

A Mountain of Distracting Details



Finding NIST's theory of the collapse takes some work because of the size of the Report. As I note above, NIST does not actually provide a complete theory of the collapse, only a theory of events that led up to "collapse initiation." However, the casual reader may conclude that NIST does provide a complete theory from phrases in section titles such as "Collapse Analysis," "Global Analysis," and "Probable Collapse Sequences."

Many readers will miss NIST's collapse theory entirely just because of the sheer volume of the Report. It takes some work to find its theory in the Table of Contents. It is buried in *Part II: 'Reconstructing the Disaster' / Chapter 6 'Reconstruction of the Collapses' / Section 6.14 'Collapse Analysis of the Towers.'* That section is nine mostly redundant pages with the primary account of the theories for the North and South Towers occupying only three and four paragraphs. These accounts have virtually no quantitative detail, which contrasts with the scores of pages describing plane impact modeling and fire tests and modeling.

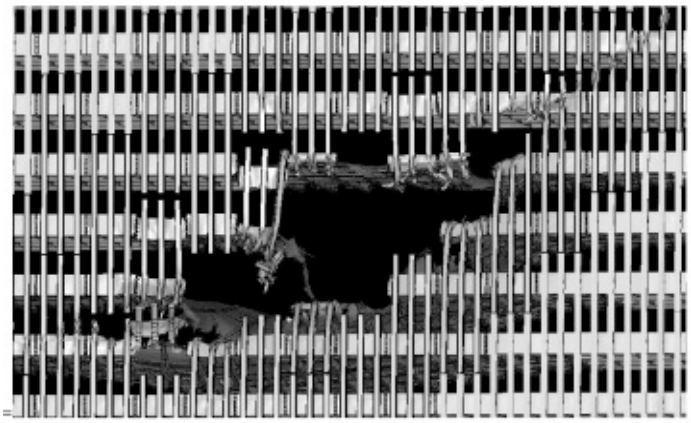


Mixing Observation and Speculation

A key technique the Report uses to add realism to its theory is to mix observational data with speculation, while failing to note the difference. For example, in numerous places the Report juxtaposes its estimates of core column damage (which are highly speculative) next to estimates of perimeter column damage (which can be inferred directly from photographic evidence).

> The debris cut a shallow path through the west and center array of trusses, damaging the insulation up to the north wall of the building core. This devastation took 0.7 s. The structural and insulation damage was considerable and was estimated to be:
>
> - 35 exterior columns severed, 2 heavily damaged.
> - 6 core columns severed, 3 heavily damaged.
> - 43 of 47 core columns stripped of insulation on one or more floors.
> - Insulation stripped from trusses covering 60,000 ft^2 of floor area.
>
> (p 22/72)

Figure 6–13. Finite element model of the Boeing 767-200ER.



(b) Calculated damage

NIST created detailed models of the aircraft and portions of the Towers so they could simulate the crashes.

As noted below, the Report asserts that infernos raged in the Towers' cores with quantitative detail that could easily mislead the reader into thinking that there is evidence to support it. Elsewhere the Report admits that there is no visual evidence for fires close to or in the cores.

> Fires deeper than a few meters inside the building could not be seen because of the smoke obscuration and the steep viewing angle of nearly all the photographs. (p 127/177)

Cinematic Emphasis

While providing extreme detail in certain areas, the Report makes key assertions without any detail or supporting evidence, often couched in language seemingly calculated for emotive effect. For example, the Report suggests that there was something very unusual about the construction of the Towers' trussed floor diaphragms.

> ... each tenant floor consisted of 4 in. thick, lightweight cast-in-place concrete on a fluted steel deck, but that is where "ordinary" ended. Supporting the slab was a grid of lightweight steel bar trusses. (p 10/60)

Elsewhere the Report notes that the Towers used "an innovative framed-tube concept." While it is true that this design was relatively novel when the Towers were built, today, most of the tallest skyscrapers employ such a design -- a framed tube with long trussed floor spans connecting the core to the perimeter.

The Report repeatedly assures us that steel heats rapidly when exposed to fire.

> Bare structural steel components, when exposed to a large and sustained fire, can heat rapidly to the point where their ability to support their load is compromised. (p 11/61)

> Bare structural steel components can heat quickly when exposed to a fire of even moderate intensity. Therefore, some sort of thermal protection, or insulation, is necessary. (p 69/119)

Bare steel in fire places and wood stoves "can heat quickly when exposed to a fire of even moderate intensity," but we don't often see fireplace gratings or wood stoves collapsing.

These statements are disingenuous because they ignore the effect of steel's thermal conductivity, which draws away heat, and the considerable thermal mass of the 90,000 tons of steel in each Tower. The Report's implication that fire protection is essential is highly misleading, given that no steel-framed high-rise building has ever collapsed from fires, whether the steelwork was fire protected or not.

Another dramatic device is to anthropomorphize the buildings, a technique NIST uses with greater subtlety than the *New York Times*, which titled its documentary series 'Fighting to Live as the Towers Died.'

> ... there began the steady burning of the office furnishings and the 13 tons of combustibles from the aircraft that would **eventually overwhelm the already damaged building.** (p 24/74)
> [emphasis added]

Imagined Heat

The Report repeatedly makes claims that amazingly high fire temperatures were extant in the Towers, without any evidence. The Report itself contains evidence contradicting the claims.

> Observations of paint cracking due to thermal expansion. Of the more than 170 areas examined on 16 perimeter column panels, only three columns had evidence that the steel reached temperatures above 250 ºC: east face, floor 98, inner web; east face, floor 92, inner web; and north face, floor 98, floor truss connector. Only two core column specimens had sufficient paint remaining to make such an analysis, and their temperatures did not reach 250 ºC. ... Using metallographic analysis, NIST determined that there was no evidence that any of the samples had reached temperatures above 600 ºC. (p 90/140)

The highest temperatures estimated for the samples was 250 ºC (482 ºF). That's consistent with the results of fire tests in uninsulated steel-framed parking garages, which showed maximum steel temperatures of 360 ºC (680 ºF). How interesting then, that NIST's sagging truss model has the truss heated to 700 ºC (1292 ºF).

> A floor section was modeled to investigate failure modes and sequences of failures under combined gravity and thermal loads. The floor section was heated to 700 ºC (with a linear thermal gradient through the slab thickness from 700 ºC to 300 ºC at the top surface of the slab) over a period of 30 min. Initially the thermal expansion of the floor pushed the columns outward, but with increased temperatures, the floor sagged and the columns were pulled inward. (p 98/148)

Where does NIST get the idea that steel temperatures should be more than 450 degrees Celsius (or 842 degrees Fahrenheit) higher than their own evidence indicates? This passage provides some insight into their experimental method.

> A spray burner generating 1.9 MW or 3.4 MW of power was ignited in a 23 ft by 11.8 ft by 12.5 ft high compartment. The temperatures near the ceiling approached 900 ºC. (p 123/173)

1.9 to 3.4 MW (megawatts) is the **heat output of about 500 wood stoves** -- that in a living-room-sized space!

> The jet fuel greatly accelerated the fire growth. Only about 60 percent of the combustible mass of the rubblized workstations was consumed. The near-ceiling temperatures varied between 800 ºC and 1,100 ºC. (p 125-6/175-6)

Temperatures of 800 ºC to 1,100 ºC (1472 ºF to 2012 ºF) are normally observed only for brief times in building fires, in a phenomenon known as flashover. Flashover occurs when uncombusted gases accumulate near the ceilings and then suddenly ignite. Since flame consumes the pre-heated fuel-air mixture in an instant, very high temperatures are produced for a few seconds. Note that this temperature range includes the 900 ºC recorded using the megawatt super-burner, so they must have had to pour on quite a lot of jet fuel.

The first section of the Report describing the fires deceptively implies that 1,000 ºC (1832 ºF) temperatures (rarely seen in even momentary flashovers) were sustained, and that they were in the building's core.

> Aside from isolated areas, perhaps protected by surviving gypsum walls, the cooler parts of this upper layer were at about 500 ºC, and in the vicinity of the active fires, the upper layer air temperatures reached 1,000 ºC. The aircraft fragments had broken through the core walls on the 94th through the 97th floors, and temperatures in the upper layers there were similar to those in the tenant spaces. (p 28/78)

Note the absurdity of asserting that the fires in the core were as intense as those in the tenant spaces when the core:

- Had very little fuel
- Was far from any source of fresh air
- Had huge steel columns to wick away the heat
- Does not show evidence of fires in any of the photographs or videos

Furthermore, NIST's suggestion of extremely high core temperatures is contradicted by its own fire temperature simulations, such as the one illustrated on the right, which show upper-level air temperatures in the core of mostly below 300 ºC.

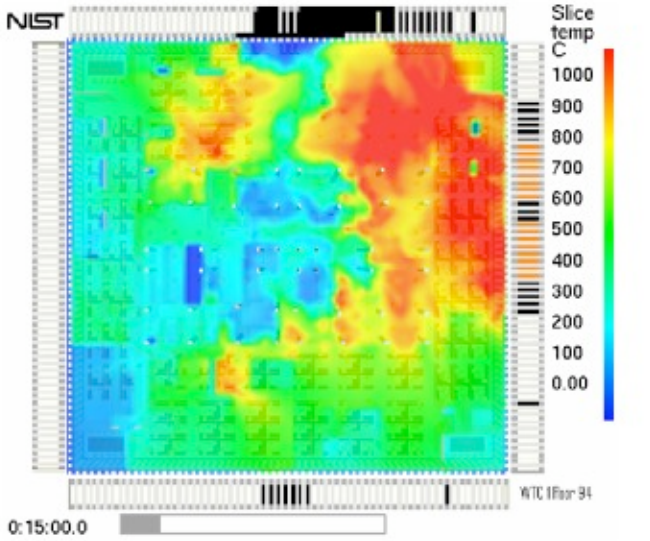


Figure 6–36. Upper layer temperatures on the 94th floor of WTC 1, 15 min after impact.

Ignored Conduction?

NIST apparently ignored thermal conduction within its model of the steel structure. Since steel is a good conductor of heat, and the steel in the Twin Towers' structures was well connected, their massive steel structures would have drawn heat away from the parts that were exposed to fire. The Report describes a model of "The Fire-Structure Interface", and describes the computation of heat transfer between the air and the steel structure, but it does not mention the conduction of heat along spans of the steel structure. (p 131-2/181-2) The suspicion that NIST simply ignored the conduction of heat within the steel is corroborated by the Report's disclosure that they used heat transfer tests on isolated steel elements to calibrate their model. (p 134/184)

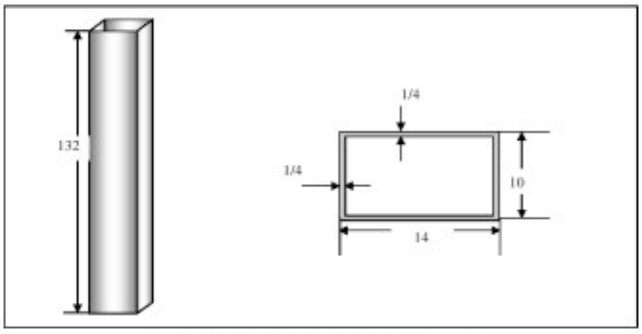


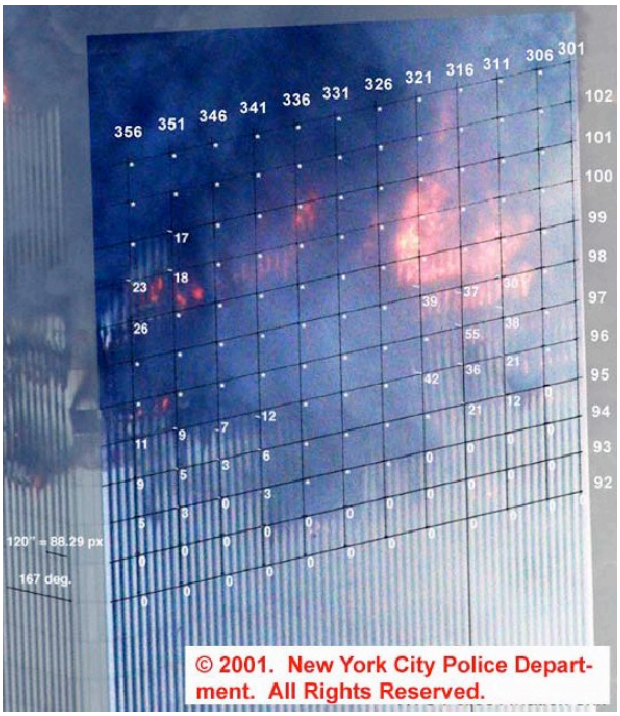
Figure 6–40. Tubular column dimensions (in.).

NIST calibrated its computer model of heat transfer to the steel structure using thermally isolated pieces of steel. NIST does not appear to have taken into account the role of heat conduction within the steel structure in lowering the temperatures of the fire-exposed steel.

Bowed Columns, or Refracted Light?

A key part in NIST's theory of the collapse initiation is that the perimeter columns on one of the faces of each Tower bowed inward, pulled by sagging trusses. The Report contends that the columns on the south face of the North Tower bowed inward in the moments before its collapse and that the columns on the east face of the South Tower bowed inward some time before its collapse. As evidence for the supposed bowed columns NIST cites photographs. The Report includes one annotated photograph allegedly showing bowing in the North Tower, but no such photographs of allegedly bowing of columns in the South Tower. There are two photographs of alleged South Tower column bowing in an earlier slide presentation.

NIST fails to consider an alternative explanation for the bowed appearance of columns in its selected photographs of the Twin Towers: light refraction caused by the layer of hot air adjacent to the Towers. Such atmospheric conditions would refract light in a way that is consistent with apparent distortion of the columns seen in the photographs.



This illustration is in the slide presentations predating the Report, and is included in the final Report (p 33/83). NIST assigns inward displacements of every fifth column at each floor based on their appearance in the photograph.

NIST's "Global Analysis"

The nearly-300-page Report has one and a half pages describing the "Results of Global Analysis" of the collapses. These are in two sections introduced by the following description, which seems designed to confuse observations of localized damage with the idea that the entirety of each tower was "unstable."

> The results were a simulation of the structural deterioration of each tower from the time of aircraft impact to the time at which the building became unstable, i.e., was poised for collapse. (p 144/194)

Earlier versions of this essay critiquing the Report's Draft excerpted the entirety of the two sections describing the results of NIST's "Global Analysis." Here we excerpt only the final paragraphs, which imply that NIST modeled the tilting and downward movement of the "upper building section[s]."

> **6.14.2 Results of Global Analysis of WTC 1**
> ...
>
> The inward bowing of the south wall caused failure of exterior column splices and spandrels, and these columns became unstable. The instability spread horizontally across the entire south face. The south wall, now unable to bear its gravity loads, redistributed these loads to the thermally weakened core through the hat truss and to the east and west walls through the spandrels. The building section above the impact zone began tilting to the south as the columns on the east and west walls rapidly became unable to carry the increased loads. This further increased the gravity loads on the core columns. Once the upper building section began to move downwards, the weakened structure in the impact and fire zone was not able to absorb the tremendous energy of the falling building section and global collapse ensued. (p 144-5/194-5)
>
> **6.14.3 Results of Global Analysis of WTC 2**
> ...

> The south exterior wall displaced downward following the aircraft impact, but did not displace further until the east wall became unstable 43 min later. The inward bowing of the east wall, due to the inward pull of the sagging floors, caused failure of exterior column splices and spandrels and resulted in the east wall columns becoming unstable. The instability progressed horizontally across the entire east face. The east wall, now unable to bear its gravity loads, redistributed them to the thermally weakened core through the hat truss and to the east and west walls through the spandrels.
>
> The building section above the impact zone began tilting to the east and south as column instability progressed rapidly from the east wall along the adjacent north and south walls, and increased the gravity load on the weakened east core columns. As with WTC 1, once the upper building section began to move downwards, the weakened structure in the impact and fire zone was not able to absorb the tremendous energy of the falling building section and global collapse ensued. (p 145-6/195-6)

So we get detailed computer simulations of how the planes were shredded by the impacts, but when it comes to the collapses, the most quantitative thing we get is "tremendous energy of the falling building section." Why are there no calculations of the approximate amount of energy?

It is very significant that the Report does not display any images of its *multifloor global model* or its *global model* actually showing the "building section above the impact zone" beginning to tilt or beginning to move downward. There are a number of illustrations of its *multifloor global model* such as to the right, but none show "column instability", tilting, or downward movement.

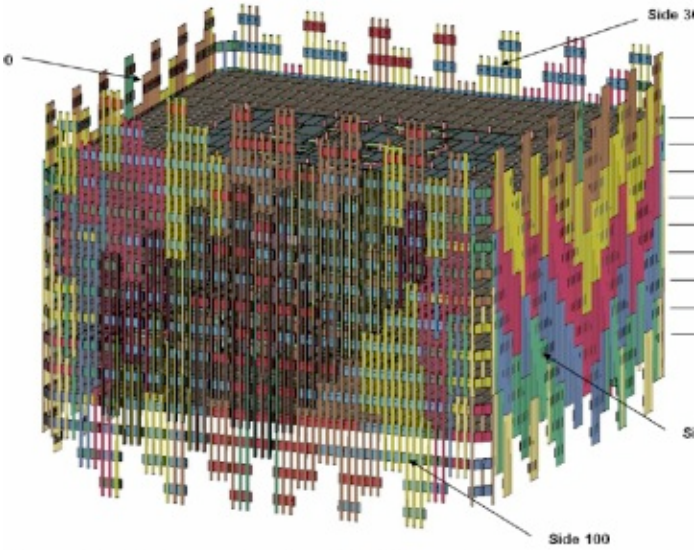


Figure 6–8. Multifloor global model of WTC 1, viewed from the north.

NIST's Vacuous Response to its Critics

The main difference between the Draft and the Final Report is the addition in the Final Report of Section 6.14.4, "Events Following Collapse Initiation," which consists of five paragraphs filling half a page. This section apparently constitutes the "little analysis of the structural behavior" following "collapse initiation" mentioned in the Executive Summary. Section 6.14.4 promotes the pile-driver theory with a circular argument; cherry-picks, misrepresents, and dismisses with faulty arguments evidence of controlled demolition; and attacks the demolition hypothesis by melding it with hoaxes.

The Pile-Driver Theory, Again

The first two paragraphs of the new section reiterate the pile-driver theory using similar language and vagueness to many earlier tellings of the theory.

> Failure of the south wall in WTC 1 and east wall in WTC2 caused the portion of the building above to tilt in the direction of the failed wall. The tilting was accompanied by a downward movement. The story immediately below the stories in which the columns failed was not able to arrest this initial movement as evidenced by videos from several vantage points.
>
> The structure below the level of the collapse initiation offered minimal resistance to the falling building mass at and above the impact zone. The potential energy released by the downward movement of the large building mass far exceeded the capacity of the intact structures below to absorb that through energy of deformation. (p 146/196)

Note the observations that the structure below was "not able to arrest this initial movement," and

"offered minimal resistance." The Report implies that this was because the force of the falling mass destroyed the intact structure below it. It does not actually state this, however, or rule out the shattering of structure by explosives as the reason for the minimal resistance. Instead, it states that the energy of the falling mass exceeded the "energy of deformation" that the intact structures could supply. That may or may not be true, but the intact structure could have arrested the downward movement of the top without deforming by simply transmitting the impact forces to the ground. These nuances of meaning will not be noticed by the casual reader but could provide the investigators with an out in the event that they are charged with covering up the crime of the intentional controlled demolition of the Towers. Statements that are grossly misleading but legally defensible because they are technically true are one of the hallmarks of a sophisticated cover-up.

Perfunctory Explanations of Two Features

The next two paragraphs in the new section are the only places in the Report where NIST addresses critiques that the Draft Report avoided considering evidence of the controlled demolition of the Twin Towers. The third paragraph addresses the rapid rate of fall. It reads:

> Since the stories below the level of collapse initiation provided little resistance to the tremendous energy released by the falling building mass, the building section above came down essentially in free fall, as seen in videos. As the stories below sequentially failed, the falling mass increases, further increasing the demand of the floors below, which were unable to arrest the moving mass. (p 146/196)

This does not explain either why the structure below failed to arrest the falling mass or how the structure failed to appreciably slow the falling mass. As in the preceding paragraphs, NIST begs these questions using a kind of circular argument: *The towers fell rapidly because the stories below could not resist the tremendous energy of the falling mass. Videos clearly show that the upper section fell essentially in free-fall. Therefore the structures below offered minimal resistance to and were destroyed by the falling mass.* The argument pre-supposes the conclusion that the force that overcame the resistance of the structures below was the falling mass, not some other force such as energy of explosives.

The fact that there is not a single example of total top-down progressive collapse outside of the alleged examples of the Twin Towers makes it entirely unscientific to pre-suppose that the alleged phenomenon was operative here.

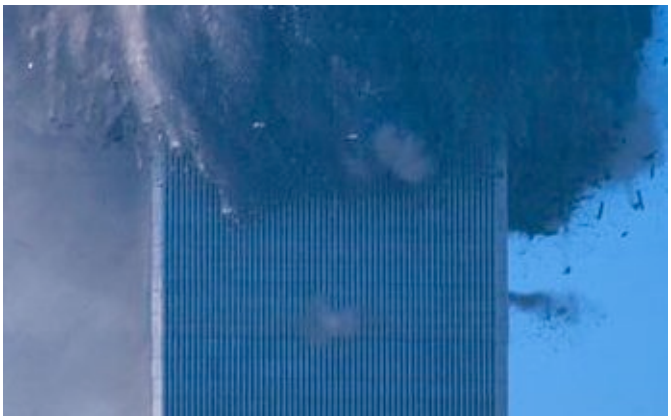
Like virtually every other endorsement of the pile-driver theory, NIST's is entirely free of quantitative detail. Why does NIST not even attempt to quantify the amount of energy that the top of each Tower would accumulate after a free-fall of one story -- an easy calculation? Perhaps because it would draw attention to the many problems of the pile-driver theory, including:

- No column failure theory excluding demolition can account for the top suddenly starting to fall freely.
- Photographs and videos show the top of both Towers breaking up before reaching the crash zone, disproving the existence of the supposed pile drivers.
- Most of the rubble appears to fall outside of the Towers' footprint, thus being unavailable to crush the intact structure.
- Rubble falls through the air outside of the Towers' profiles at about the same speed it falls through their profiles, showing that the structures below provided little to no more resistance than air.

The fourth paragraph addresses the jets of dust, often called "squibs." It reads:

> The falling mass of the building compressed the air ahead of it, much like the action of a piston, forcing material, such as smoke and debris, out the windows as seen in several videos. (p 146/196)

NIST conceals the nature of the energetic ejections by describing them only as material "forc[ed] ... out the windows". It does not mention any resources for examining this evidence, such as these video frames showing dust ejections from the North Tower.



NIST attempts to explain away without disclosing evidence for or even accurately describing this demolition feature: energetic jets of dust emerging symmetrically from the Tower's faces. (Image copyright: Richard Lethin)

When one examines these ejections, it becomes obvious that NIST's piston theory does not begin to explain them, for a number of reasons including:

- No photographs show evidence of the alleged piston moving down inside of the Towers, and the thickness of the dust clouds indicate that the floors were being pulverized well above the ejections.
- The ejections appear at regular intervals on all visible faces of the North Tower, a pattern much too regular to be explained by the piston theory.
- The North Tower's ejections are very energetic and focused, blasting through single openings on each face. This challenges the piston theory to explain how the relatively even application of pressure caused by falling floors could be contained by all but single windows in the middle of each face.
- The ejections appear to contain thick dust such as of pulverized concrete and gypsum, which would not be generated until after a floor had already collapsed and ejected its air.

NIST thus attempts to explain away only two of the six features of controlled demolition enumerated in the Conclusion of this essay, and in the essay's earlier version critiquing the NIST's Draft Report.

Playing the Missiles and Basement Bombs Straw Men

In the last paragraph, NIST employs the straw-man tactic used so extensively by the *Popular Mechanics* article. It reads:

> NIST found no corroborating evidence for alternative hypotheses suggesting that the WTC towers were brought down by controlled demolition using explosives planted prior to September 11, 2001. NIST also did not find any evidence that missiles were fired at or hit the towers. Instead, photos and videos from several angles clearly showed that the collapse initiated at the fire and impact floors and the collapse progressed from the initiating floors downward, until the dust clouds obscured the view. (p 146/196)

It may be true that NIST failed to find corroborating evidence of controlled demolition: perhaps its investigators were careful not to look at any of its 6,977 segments of video footage or 6,899 photographs capturing events after "collapse initiation." It may also be true (and is much more plausible) that NIST didn't find evidence of the missile strikes alleged by *letsroll911.org*, *In Plane Site*, and *Loose Change*. NIST employs the same strategy as these productions: pairing the controlled demolition hypothesis with the nonsensical idea that the crashing planes fired missiles into the Towers, in order to discredit the hypothesis. As with the *Popular Mechanics* piece before it, the overt apologists for the official story work hand-in-glove with sensational productions that attack the official story with phony evidence.

NIST's second use of the straw-man tactic in the paragraph is more subtle. It implies that controlled demolition would have destroyed the Towers in an order other than that observed -- from the bottom up instead of from the top down. This ignores the fact that controlled demolitions are controlled, and therefore demolition sequences can be effected in any order desired. In the case of the Twin Towers,

the demolitions would have been designed so that the destruction could be blamed on the plane crashes and fires, and hence would have been initiated around the crash zones. (Even in that detail, they leave something to be desired, since there is evidence that the top of each tower was broken up before falling into the crash zone.)

NIST does not explicitly mention the basement bombs theory but falsely implies that all controlled demolition theories are synonymous with it, requiring the explosions to start low in the Towers. This suggests a reason that the basement bombs theories have been aggressively promoted in literature purporting to challenge the official story: It provides a convenient straw man that defenders of the official story such as NIST can falsely identify with all demolition hypotheses in order to discredit them.

Correcting the ASCE's Candor

NIST's is the second of only two official government investigations of the collapses of the World Trade Center buildings. The Report makes the following reference to the earlier investigation, in which FEMA assembled a team of volunteers from the American Society of Civil Engineers (ASCE):

> Immediately following the terrorist attack on the World Trade Center (WTC) on September 11, 2001, the Federal Emergency Management Agency (FEMA) and the American Society of Civil Engineers began planning a building performance study of the disaster. The week of October 7, as soon as the rescue and search efforts ceased, the Building Performance Study Team went to the site and began their assessment. This was to be a brief effort, as the study team consisted of experts who largely volunteered their time away from their other professional commitments. The Building Performance Study Team issued their report in May 2002, fulfilling their goal "to determine probable failure mechanisms and to identify areas of future investigation that could lead to practical measures for improving the damage resistance of buildings against such unforeseen events." (p xxix/31)

This is misleading for several reasons:

1. It implies that the Building Performance Assessment Team (BPAT) conducted an on-site investigation of the collapses, when in fact they were only allowed a walk-through of Ground Zero, derided by an investigator as a "tourist trip." Their only hands-on study of the debris was in salvage yards, and included an examination of far less than 1% of the steel.
2. It claims they "determine[d] probable failure mechanisms," but their findings were in fact equivocal. Furthermore, NIST developed an entirely different collapse initiation theory based on column failure, which is incompatible with the ASCE's theory based on truss failure. Contrary to NIST, neither theory is probable.

The ASCE's Equivocation

About the Twin Towers, FEMA's report stated:

> With the information and time available, the sequence of events leading to the collapse of each Tower could not be definitively determined.

On Building 7 they were even more reserved:

> The specifics of the fires in WTC 7 and how they caused the building to collapse remain unknown at this time. ... the best hypothesis has only a low probability of occurrence. Further research, investigation, and analyses are needed to resolve this issue.

It is, therefore, misleading for NIST to say that the FEMA-ASCE report determined the "probable failure mechanisms."

Like NIST's Report, FEMA's report did not attempt to provide an explanation for the total collapses of the Twin Towers. However, it did venture slightly beyond the NIST's cutoff of "collapse initiation,"

stating:

> As the floors collapsed, this left **tall freestanding portions** of the exterior wall and **possibly central core columns**. As the unsupported height of these freestanding exterior wall elements increased, they buckled at the bolted column splice connections, and also collapsed.
> [emphasis added]

Note that no photographs show "tall freestanding portions" or any substantial portions of the exterior walls above the descending rubble clouds. Also, even without the floors surrounding them, the core columns were not freestanding, but were connected by horizontal I-beams into lattices of steel. The authors' use of the non-committal "possibly central core columns" suggests they don't believe their collapse theory.

NIST's Report shows no such equivocation or doubt-revealing ambiguity.

The ASCE's Disclosures of Steel Sulfidation

One of the more interesting parts of FEMA's report is Appendix C: Limited Metallurgical Examination in which the investigators revealed that examination of the macro- and micro-structure of specimens of the steel show that it was rapidly corroded by sulfidation. Appendix C concludes with:

> The severe corrosion and subsequent erosion of Samples 1 and 2 are a very unusual event. No clear explanation for the source of the sulfur has been identified. ... A detailed study into the mechanisms of this phenomenon is needed to determine what risk, if any, is presented to existing steel structures exposed to severe and long-burning fires.

The authors don't speculate on whether the findings are evidence of explosives, but the *New York Times* called them "perhaps the deepest mystery uncovered in the investigation."

Despite the ASCE's call for further investigation, NIST's Report ignores the findings. Its five pages in *Section 6.4 Learning from the Recovered Steel* (p 86/136) includes a subsection on damage analysis with considerable detail, including some "observations of the microstructure of the steel." It fails to mention the sulfidation discovered by ASCE volunteers.

Omissions and Distortions

Omissions and Distortions is the subtitle of David Ray Griffin's book critiquing the 9/11 Commission Report. Given the likelihood that NIST's Report will be greeted by the mainstream media with uncritical acceptance similar to that enjoyed by the 9/11 Commission Report, it deserves a critique as thorough as Griffin's. This essay is much less ambitious, and does not attempt to provide a thorough enumeration of the Report's flaws. In this section I just note some of the more serious omissions and distortions apart from the ones mentioned in the preceding sections.

The Privatization of the World Trade Center

After providing a fairly detailed overview of the history of the World Trade Center, the Report mentions that WTC 7 "was completed in 1987 and was operated by Silverstein Properties, Inc." (p 2/52) However, the Report makes no mention of the fact that a private consortium headed by Silverstein Properties acquired a 99-year lease of the main World Center complex on July 24, 2001. Nor does it mention that the new landlord secured an array of insurance policies that included a special provision for loss due to terrorist attacks, and, subsequent to the attack, successfully sued the insurers to obtain twice the value of the policy based on its being "two occurrences" (two airplane crashes).

Chief Palmer's Radio Call

The Report conceals one of the most vivid accounts of heroism in responding to the attack. Battalion Chief Orio J. Palmer had reached the 78th floor of the South Tower by 9:48 -- 11 minutes before the explosive collapse began -- and reported via radio "two isolated pockets of fire." In contrast to Palmer's communication, NIST's Report implies that no firefighters were able to reach the crash zones.

> However, there was insufficient time and no path to reach any survivors on the impact floors and above. Any attempts to mitigate the fires would have been fruitless due to the lack of water supply and the difficulty in reaching the fire floors within the time interval before the building collapse. (p 34/84)

> It would take hours to accumulate sufficient people and equipment to access the impact zones. (p 167/217)

NIST gets the closest to admitting Palmer's account here:

> From radio communications and first-person interviews, it appears that there were responders as high as floors in the 50s in WTC 1 and the 78th floor in WTC 2. (p 170/220)

Here's a transcript of a portion of the radio communication with Chief Palmer:

> *Battalion 7 Chief:* Battalion Seven ... Ladder 15, we've got two isolated pockets of fire. We should be able to knock it down with two lines. Radio that, 78th floor numerous 10-40 Code Ones.
> ...
> *Ladder 15:* Floor 78?
>
> *Battalion 7 Chief:* Ten-four, numerous civilians, we gonna need two engines up here.
> ...
> *Battalion 7 Chief:* I'm going to need two of your firefighters Adam, stairway to knock down two fires. We have house line stretched we could use some water on it, knock it down, kay.

Excuses, Excuses

Of the 1,344 people estimated to have been on or above the 91st floor of the North Tower when the plane hit, not a single person survived, the crash having blocked all three stairwells. But many might have been rescued from the roof, had not the doors been locked and helicopter rescue barred. Two choppers arrived within 5 minutes of the crash, one of which was a Bell 412 equipped with a 250-foot hoist and capable of carrying as many as 10 survivors at a time, and carrying a three-man crew specially trained for rooftop rescues. One of the choppers was piloted by Greg Semendinger, who had helped to rescue 28 people after the 1993 WTC parking garage bombing. Semendinger and other veteran pilots have stated that rescue from the North Tower roof would have been difficult but possible. But on 9/11/01, no rooftop rescues were allowed.

Light wind from the north bathed the northern portion of the North Tower's roof with cool, fresh air. (Image copyright: Aman Zafar)

NIST avoids any mention of the 1993 rooftop rescues and the opinions of pilots that rescue was an option.

> Some of the people went toward the roof. However, there was no hope because roof evacuation was neither planned nor practical, and the exit doors to the roof were locked. (p 26/76)

The following passage in the Draft was omitted from the Final Report, possibly because the earlier

version of this essay had pointed out that photographs and the words of the helicopter pilots had documented the accessibility of the northern portion of the North Tower's roof.

> Even had the roof been accessible, the helicopters could not have landed due to the severe heat and smoke. (p 26/80 of Draft)

However, most of the Report's references to the lack of rooftop rescue remain the same as in the Draft. NIST excuses the locked doors and lack of notification to the occupants as a matter of code:

> The 2003 code does not intend roof access to be used for evacuation and has no prohibition on locking this access. (p 168/218)

NIST excuses the amazing prohibition of rooftop rescue by misrepresenting the condition of the roof, and by falsely implying that a helicopter would have had to land on the roof to effect any rescue.

> NYPD helicopters reached the scene by 8:52 to assess the possibility of roof rescue. They were unable to land on the roof due to heavy smoke conditions. During the first hour, FDNY did not consider the option of roof rescue. When the aircraft struck WTC 2, it was clear that this was criminal activity, and the decision regarding roof top operations became the responsibility of NYPD. The NYPD First Deputy Commissioner ordered that no roof rescues were to be attempted, and at 9:43 a.m., this directive was passed to all units. (p 168/218)

This implies that an hour instead of 18 minutes passed between the North Tower strike (8:46) and the South Tower strike (9:03). Also, it was clear almost immediately after the first strike that people could not evacuate downward from above the crash zone. Why then did the unnamed First Deputy Commissioner prohibit rooftop rescue? NIST shows no curiosity at this decision, but makes further excuses, suggesting that a few lives weren't worth the effort:

> Even if it had been possible for a helicopter to gain access to the roof, only a very small fraction of the large number of people trapped above the impact zone could have been rescued before the Towers collapsed. (p 169/219)

Given the great lengths and expense to which public officials often go to save a single life, it is striking that the Report's authors suggest that there was nothing wrong with the NYPD decision to prohibit attempts to rescue people from the roof. This, like the Report as a whole, is evidence that the authors would defend the authorities no matter what their conduct.

Fudging the Models

The Report contains a lengthy accounting of how the models performed under various assumptions about the buildings and the planes. One assumption common to all their simulations is the following:

> The two Tower models included the core columns, the floor beams, and the concrete slabs from the impact and fire zones to the highest floor below the hat truss structure: from the 89th floor to the 106th floor for WTC 1 and from the 73rd floor to the 106th floor for WTC 2. Within these floors, **aircraft-damaged structural components were removed**. (p 100/150)
> [emphasis added]

Apparently, any structural component estimated to have been damaged to any degree was removed from the model -- as if it contributed nothing to the structure. In other words, if NIST's crash simulation predicted that a column had lost 10% of its load-bearing capacity, it was treated as if it had lost 100% of its capacity.

For each Tower, NIST created two cases. The first set of cases, North Tower case A and South Tower case C, were based on the averages of NIST's estimates of building and plane strength, impact trajectories and speeds, etc. The second set of cases, North Tower case B and South Tower case D, assumed conditions more favorable to the failure of the buildings. The enhancements adopted

for Cases B and D over cases A and C are described in the following table:

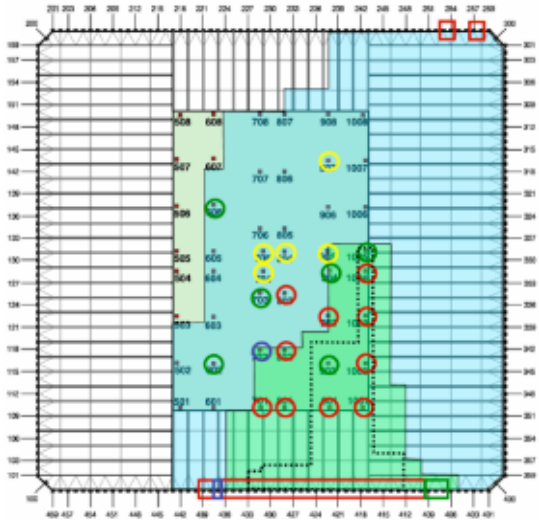
	North Tower	South Tower
increase in impact speed	29 mph	28 mph
decrease in approach angles	3º	1º
increase in aircraft weight	5%	5%
increase in aircraft strength	25%	15%
decrease in Tower strength	20%	15%
decrease in Tower live load	20%	20%
increase in Tower fuel load	25%	25%

The Report noted that cases A and C did not produce results matching observations, so cases B and D were selected for use in its four-step modeling.

Since the Report does not provide any evidence that NIST was able to model its alleged "collapse initiation" in which the "upper building section" began tilting and then moving downward (as noted in NIST's "Global Analysis"), one might ask why they bothered to fudge their models. Perhaps NIST's detailed descriptions of its substitution of cases B and D to for cases A and C is a dissembling tactic. Showcasing the adjustment of parameters to favor the failure of its computer-modeled buildings draws attention away from the lack of any evidence that NIST's models predicted building failure at all.

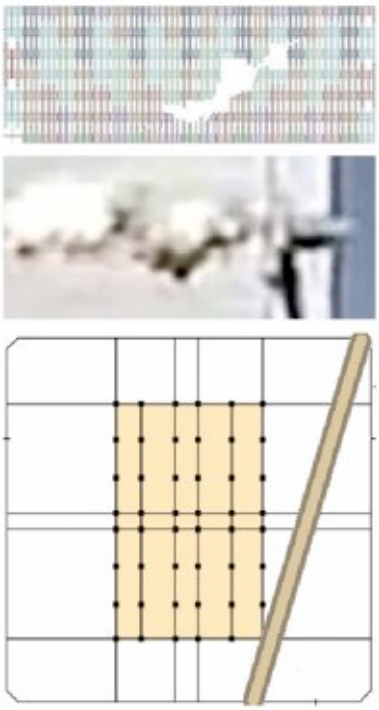
Altering Flight 175's Path

Whereas NIST admits some of the liberties it took in adjusting its models' parameters to fit the desired result, such as their substitution of cases B and D for the more accurate cases A and C described above, it hides others. For example, NIST estimates that the crash of Flight 175 severed 10 core columns and damaged 11 others. That damage estimate assumes that the plane impacted the right side of the core nearly head-on.



This illustration (p 115/165) shows NIST's estimate of damage to the South Tower's columns, red indicating severed columns.

NIST's assumption contradicts FEMA's estimate of Flight 175's trajectory, as well as the simple analysis of the plane's path through the building based on the entry and exit points of the fuselage. The illustration to the right shows the South Tower's impact gash, a video frame showing a fragment of fuselage exiting the Tower's east corner, and the path connecting the centers of the entry and exit holes. That trajectory left only the left wing and engine to do nearly all of the alleged damage to the Tower's core structure.



This illustration from WAKING UP FROM OUR NIGHTMARE shows the probable path of Flight 175's fuselage through the South Tower based on the appearance of a fragment the diameter of the fuselage exiting

In contrast, NIST estimates that Flight 11 severed only six of the North

Tower's core columns. Thus, NIST estimates that the North Tower had less core damage than the South Tower, which is completely implausible because:

- Flight 11 impacted the North Tower's core in a direct, centered fashion, contrasting with Flight 175's off-centered impact, glancing the core.
- The core columns at the North Tower's 95th floor impact zone were only about half as thick as the core columns at the South Tower's 80th floor impact zone.

These facts are evidence that NIST modified the trajectory of Flight 175 to enhance core damage, and that it incorrectly modeled the core columns in the South Tower impact zone as small H-columns instead of large box columns.

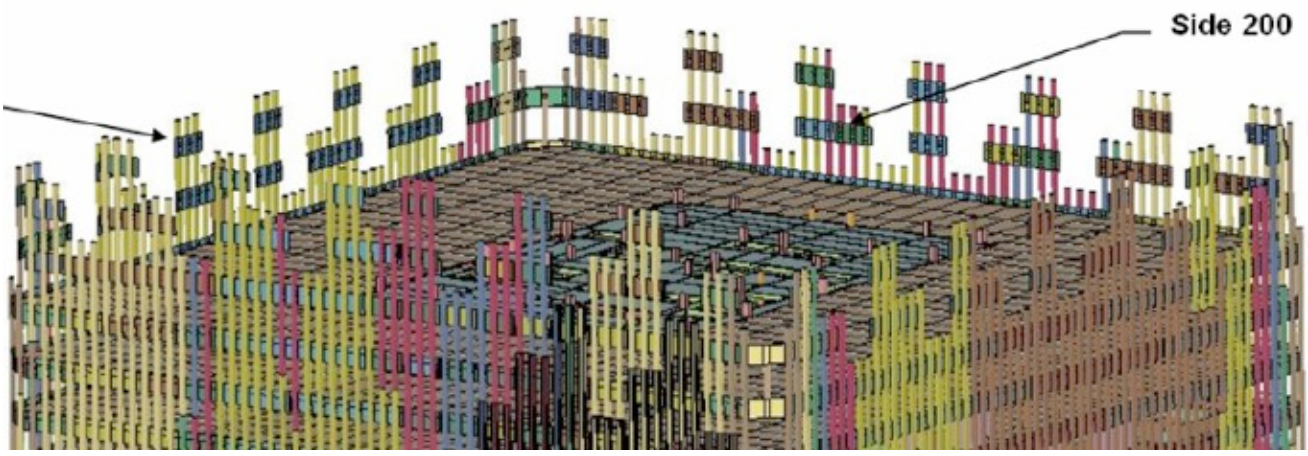
its east corner.

This photograph shows a piece of fuselage from Flight 175, which exited the South Tower.

Shrinking the Core Columns

Previous government reports have minimized, hidden, or denied the existence of the Towers' core columns. The FEMA report contained misleading descriptions and illustrations minimizing and hiding the core columns, and it made no mention of beams connecting the core columns. The 9/11 Commission Report denied their existence entirely, claiming that "the interior core of the [Twin Towers] was a hollow steel shaft, in which the elevators and stairwells were grouped."

NIST continues in the tradition of Core Denial, with a number of misrepresentations, including, apparently, in the computer models that it supposedly used to simulate collapse initiation. Figure 6-9 shows sections of the *global model* for both the North and the South Towers. Both show the core columns to be thinner than the perimeter columns. But we know that the perimeter columns had outside dimensions of about 13.5 by 14 inches, and that most of the core columns had much larger dimensions. The outer row of core columns in each Tower apparently measured 56 by 22 inches for most of its height. We might forgive NIST for skimping on the dimensions of the core columns at the 100th floor of the North Tower, since the box columns apparently transitioned to smaller H-columns around the 100th floor, but their use of tiny core columns on the 85th floor of the South Tower is clearly in error.



This is a zoom-up of Figure 6-9 (p 96/146), which shows the "multifloor global model" for WTC 2, in which the top floor (pictured) is the 85th floor. Note the miniscule size of the core columns (the short, toothpick-like rods in the central area of the floor).

NIST's Opaque Investigation

The Report makes impressive-sounding claims about the thoroughness of its investigation. For example, it describes its collection of visual evidence:

> The assembled collection included:
>
> - 6,977 segments of video footage, totaling in excess of 300 hours. The media videos included both broadcast material and outtakes. Additionally, NIST received videotapes recorded by more than 20 individuals.
> - 6,899 photographs from at least 200 photographers. As with the videos, many of the photographs were unpublished.
>
> This vast amount of visual material was organized into a searchable database in which each frame was characterized by a set of attributes: photographer (name and location), time of shot/video, copyright status, content (including building, face(s), key events (plane strike, fireballs, collapse), the presence of FDNY or NYPD people or apparatus, and other details, such as falling debris, people, and building damage). (p 83/133)

Unfortunately NIST does not share its visual database with the public. Are there any videos in NIST's archive that show the alleged column bowing? They would immediately show whether the effect was due to refraction or to column distortion.

The Report boasts about the computer models it used to simulate the crashes and fires, but it does not make its models available for download, nor does it publish any of the data sets generated by the models.

The Report does not contain footnotes. It is filled with claims, the basis for which the reader can only guess. It leaves the public with no way to compare its conclusions with the evidence on which it was purportedly based.

Conclusion

Assuming the premise of the official explanation, the total collapses of the Twin Towers and Building 7 were the largest, most unexpected, and least understood failures of engineered steel structures in the history of the world. NIST's Report, like FEMA's 2002 report, presents the appearance of explaining the collapses of the Twin Towers, but in reality it doesn't explain them at all. Flatly asserting that "global collapse" inevitably follows "collapse initiation," the Report implies that the only issue worthy of study is how the jet impacts and fires led to collapse initiation -- an issue to which it devotes well over one hundred pages. Thus, the Report makes two fundamental claims, the first explicit and the second implicit:

- The impact damage and fires caused the tops of the Towers to lean and then begin to fall (collapse initiation).
- Once initiated, the collapses proceeded to total collapses.

NIST goes to great lengths to support the first claim, but commits numerous omissions and distortions in the process. It remains quiet about the second claim, except for its vague rehash of the pile-driver theory. This is indefensible, given NIST's charge to investigate the collapses. Accepting that claim requires us to believe:

- That the collapses of WTC 1, 2, and 7 are the only examples of total progressive collapse of steel-framed structures in history.
- That those collapses were gravity-driven despite showing all the common physical features of controlled demolitions. In the cases of the Twin Towers, those features included the following:

- Radial symmetry: The Towers came straight down, blowing debris symmetricaly in all directions.
- Rapid descent: The Towers came down just slightly slower than the rate of free-fall in a vacuum.
- Demolition waves: The Towers were consumed by synchronized rows of confluent explosions.
- Demolition squibs: The Towers exhibited high-velocity gas ejections well below the descending rubble.
- Pulverization: The Towers' non-metallic components, such as their concrete floors, were pulverized into fine dust.
- Totality: The Towers were destroyed totally, their steel skeletons shredded into short pieces, most less than 30 feet long.

All of these features are seen in conventional controlled demolitions. None have ever been observed in steel-framed buildings collapsing for any reason other than controlled demolition.

What are the chances that a phenomenon other than controlled demolition would exhibit all six features never observed elsewhere except in controlled demolitions?

NIST avoids asking this and other questions by implying that they don't exist. It uses the false assertion that partial collapse will inevitably lead to total collapse (couched in the ill-defined terms of "column instability," "global instability," "collapse initiation," and "global collapse") to imply that nothing about the actual collapses is worth considering.

To shield the reader from the evidence of controlled demolition, NIST fills hundreds of pages with amazingly realistic plane crash simulations, tedious details about fire tests and simulations, and long lists of recommendations for improving building safety. It calls its event narrative of each Tower, which starts with the jet impact and ends at the point that "collapse ensued," the "probable collapse sequence," but it is neither probable nor a collapse sequence.

NIST's misleadingly named "probable collapse sequence" is a mirage, masking the explosive reality of the collapses with a cinematic account of the crashes and fires. NIST's theory stops at the moment that the "upper building section began to move downwards," thus avoiding the longer timeline of the truss-failure theory and any overlap with the time span in which the demolition-like features appear. Despite NIST's theory being even more incredible than its predecessors (with spreading "column instability" triggering "global collapse" in an instant) it works better as a mirage because its timelines stop short of the collapses.

NIST's Report states that its first objective is to "determine why and how WTC 1 and WTC 2 collapsed." The Report does not fulfill that objective, and hides that failure with misleading headings and disproportionate, misapplied technical detail. Its authors should admit that they have failed to explain why and how the Towers collapsed, and should call for an investigation that will address rather than avoid the issue.

SOURCE: http://911research.wtc7.net/essays/nist/