

9/11: a Terrorist Attack or a Conspiracy?

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Abstract— September 11th, 2001 was a clear Tuesday morning in New York City, USA. But, a series of events started taking place from 8:45 am that made a huge impact on the whole world. The series of four attacks by the terrorist group Al-Qaeda, in which two passenger planes crashed into the financial hub of the USA. Twin towers of the World Trade Center were attacked and were 'brought down' as reported by the media. These were the reports submitted by the written and television media, but, considering the nature of demolition of the buildings, the nature of construction of the buildings, the parameters considered while designing the buildings and several other factors, this massacre doesn't seem as easy to occur as it was reported. In this research report, the authors would go through all the smaller and bigger factors that prove the demolition/ 'bringing down' of the buildings was not just due to collision of the planes but there were more factors related to it. Also, this report focuses on the collapse of other two buildings that were affected i.e. WTC- Building 7 and The Pentagon. The collapse of these buildings weren't usual and normal as well. This paper goes through all the structural factors which deny the official reasons for the collapse of these buildings.

I. INTRODUCTION

1. About New York & World Trade Center :

New York is a densely populated state in the United States of America (USA) which is considered as a global power city as it is the financial and media capital of the world. In the heart of this city, at the banks of river Hudson was the trade complex – World Trade Center, which consisted of 7 buildings which was built in the year 1973. Out of these 7 buildings featured the landmark twin towers. These twin towers were the tallest in the world after its construction was completed. Structure wise, the buildings were developed by the Port Authority of New York and New Jersey in the Lower West side on Manhattan, New York City.

II. ABOUT THE STRUCTURE

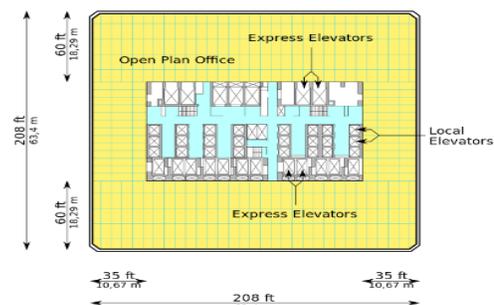
2.1 Nature of structure :

Considering the height of the towers and their nature of use, they were constructed as framed tube structure in which the building is designed to act like a hollow cylinder, cantilevered perpendicular to the ground. The construction of both the towers started in 1968 and was completed in 1972. The project of construction was given to Port Authority because they had experience in executing such large projects. The main reason for construction was to increase the volume of international commerce coming through the Port of New York.

With a mandated space requirement of

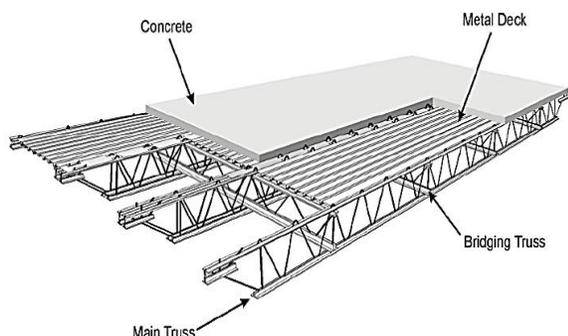
9,30,000 square metres of office space to be included in the new WTC, the initial design had 80 storeyed two towers. Another limiting factor was the number of elevators to be provided to the towers as height limited the usability of elevators in the towers. The solution to this was given by providing sky lobbies at regular intervals. As discussed earlier, the buildings were framed tube structure, with a square plan of about 208m x 208m.

System Design Concept



For the structural designing, the draft version of 1968 building codes were used. Consisting of several new inventions in the field of constructing sky scrapers, it was 'one of its kind' project in 1970s. The columns were made from high strength, load bearing steel columns which were called as Vierendeel trusses. In all, there were 60 close spaced columns on each side at the

perimeter of the towers. The perimeter columns resisted all the vertical loads (eg : wind loads) and also provided support to the core columns. The steel used in the perimeter were structural steel of grade ranging from 260 to 670 MPa, with the strength and thickness of the steel decreasing with height. All the columns were placed on bedrock. The core of the towers included 47 core steel columns which running from the bedrock to the top of the building. Core also had elevators, utility shafts and other support spaces. The large space between the perimeter and the core was bridged by prefabricated floor trusses. The floors had a 4inch concrete slab resting on a steel deck with shear connections for composite action. Most of the joints were bolted and welded. The connection of floor slabs and



The perimeter columns were done using viscoelastic dampers which reduced the amount of sway.

2.2 Wind Load:

The structure was relatively light weight structure due to the tube frame system, which resulted into more swaying compared to the traditional towers such as Empire State. To withstand the swaying action of the building, viscoelastic dampers were developed to absorb some of the sway.

2.3 Aircraft impact and fire protection :

Both the towers of WTC were tested for aircraft impacts. The tests were carried out in 1964 concluded that the towers would withstand an impact from Boeing 707 without collapsing, which was a huge passenger plane in those days. Though Boeing 767 (that crashed into the towers) were slightly larger than 707, but 707 had more destructive force at cruising speed.

“We looked at every possible thing we could think of

that could happen to the buildings, even to the extent of an airplane hitting the side... Our analysis indicated the biggest problem would be the fact that all the fuel (from the airplane) would dump into the building. There would be a horrendous fire. A lot of people would be killed. [But] the building structure would still be there” said lead structural engineer John Skilling to The Seattle Times. Considering the intense grid of the towers, it was assumed to be resistant to multiple plane crashes. Sprayed Fire Resistant Materials (SFRMs) and gypsum wallboard were used to make the structure, including the core columns, fire resistant. Post a fire incident and bombing attack, the fire resisting system was made more strict. Also, sprinklers were installed in both the buildings by the end of 1993. So, considering the whole structure, it was built strong enough by taking under consideration all the possible harms that can be done to the towers. The same was the case with WTC building 7 which was a steel framed structure too. This building was a part of the WTC complex whose construction was completed in the year 1987. It was a 47 stories tall sky-scraper with a red granite façade. The fourth important building to be considered is The Pentagon which is the headquarter of the US Defense which is one of the world’s largest office building, pentagonal in plan and is located in Virginia.



Thus, we will be considering these four buildings (WTC twin towers, WTC building 7 and The Pentagon) for the case study of the structures after the attacks. A detailed report will be presented regarding the probable behavior of the structures that were expected and the actual behavior that was observed and also the reason behind the observation will be worked out.

III. WHAT ACTUALLY HAPPENED?

The Tuesday morning of 11th September, was a usual one until the clock struck 8:46 am when Flight 11 of the American Airlines crashed into the North Tower of the WTC. Unless people could realize about the incident, a second plane, Flight 175 (a Boeing 767) crashed into the South Tower of the WTC at 9:03 am. By this time, all were informed that the USA was under a terrorist attack with two more airplanes in the air that are being hijacked. By 9:37 am, the third plane, flight 77 (Boeing 757) crashed in the west side on The Pentagon whereas fourth plane, Flight 93 (Boeing 757) that was supposed to hit targets in Washington DC was forcefully crashed in Pennsylvania. The initial two crashes of the twin towers raised the emergency alarm for the security officials of the USA. Just 56 minutes after the



Impact of the flight, the South tower collapsed. Also, after 1 hour and 42 minutes after the impact of airplane, North tower collapsed. At 10:50, 5 floors of The Pentagon collapsed due to the impact of the airplane. At 5:20 pm, Building 7 of the World Trade Center

complex collapsed which wasn't even hit by any aircraft.

IV. HOW THE DOUBT CLICKED?

The television media was replaying the footages of the planes hitting the towers and the buildings collapsing. However, the manner and style of collapse of both the towers instantly rang a bell of doubt in the minds of people of the construction industry.

4.1 What was the cause of doubt?

Both the towers collapsed in a span of 8 to 11 seconds which practically shows that they came down under 'free fall' velocity, without any resistance. Also, the damage done to the towers was asymmetric but the collapse of the towers were symmetric which is scientifically impossible. Many Civil engineers, structural engineers and explosion experts were watching these footage on the day of attack and it didn't take much time for them to realize that the collapse is not due to the impact of aircrafts. Also, the sudden collapse of Building 7 have certainly planted an instant doubt in the minds of experts from construction industry as it was neither hit by any aircraft nor did it have any serious damages.



The surrounding was covered with fine, toxic dust which is unacceptable as the planes were hit in a certain part of the towers and it is not possible to disintegrate the structure into such fine particles. These were the reasons for the instant doubts that arose in the minds of the experts watching the footages which motivated them to conduct their own investigation about the happenings of the incident. Henceforth, we will see the points that were observed by the authors of this paper while going through more than 50 footages

and 100+ photographs of the attacks. This paper is not a detailed investigation about the attacks but a basic, informatory paper which will highlight the structural changes in the towers during the attack. It also highlights on the studies carried out by the government bodies.

V. REASONS FOR DOUBT OF TWIN TOWERS:

5.1 Artificial symmetry:

The collapse of the two towers had its own characteristics of totality and uniformity, also, all the debris of the towers was centered at the building core. Taking an example of cutting a tree, as the axe chops a certain side of a tree, the tree collapses at a certain eccentricity. Considering the tree as the tower and impact of axe as the aircraft, no such eccentricity was observed in the debris of the towers. For a symmetric collapse, all the connections in the towers need to fail simultaneously, in a sequence but it is not possible in an asymmetric impact of aircraft. Also, both the towers had similar pattern of collapse. Even if the collapse was a result of weakening of steel, the collapse wouldn't have been as symmetric as it was.



Considering building 7 of WTC, it also collapsed rapidly and evenly. It wasn't hit by an aircraft though. The pace of collapse and the uniformity of the tower makes the assumption of controlled demolition very obvious. The reason



for this collapse was given as office fire. However, office fire does not generate enough heat to collapse a steel structure.

5.2 Lateral ejections:

In the videos and pictures, lateral ejections of free flying steel sections are observed. These ejections can occur only when explosion takes place as it needs a lot of force to laterally discharge heavy steel components.



These steel sections were seen several feet away from the debris. Also, they were discharged with a lot of force.

5.3 Involvement of explosives & weak fire:

The phenomenon of lateral ejection of steel section certainly proves involvement of explosives in the process of collapse. It was reported that the concrete in the debris was powderised which is not acceptable. In case of collapse due to fire, the debris of lower floors should be in chunks, which was not found. According to the official structural report, the sudden, progressive and total collapse of the towers was due to the weakened steel due to fire. However, the heat generated by jet fuel isn't sufficient to weaken steel in open air. A fire of about 750° C can be under a steel beam forever and will never reach high enough temperature to bend

the structural steel. The only way to collapse the columns were to compromise with the core columns. The below picture shows a lateral ejection caused due to explosion in the lower floor during the collapse.



Also, to support the theory of collapse were many witnesses who reported sounds of consecutive blasts during the fall of towers. More than 100 witnesses reported hearing and seeing multiple explosions. But these reports were not taken into consideration by the officials during the investigation. Most of the jet fuel was burnt in the fire ball in initial time and hence not much jet fuel was available to weaken the steel structure. The steel in the floors below the impact floors were stone cold steel as they were not into direct contact with any kind of fire. Considering building 7, the reason for collapse was reported “due to fire fueled by office furniture” as quoted by Shyam Sunder, Lead Investigator – NIST. This reason doesn't prove sufficient to bring down a 47 stories steel structure which had fire proof components in it. You need not be an architect or an engineer to judge this collapse.

5.4 Molten steel:

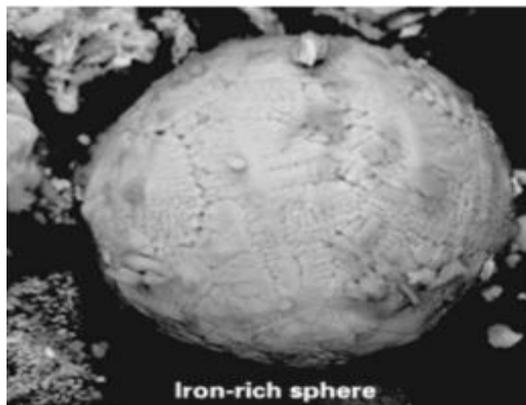
It was observed in the videos, pictures and also the witnesses confirmed the sight of red liquid metal falling off from the towers just before the collapse. The fire fighters reported presence of molten steel in the debris. The geological surveys carried out by the US found iron-rich microspheres. These spheres were found in dust of the towers all over the Manhattan. During cleaning of ground



zero, there were difficulties in cleaning due to the presence of this liquid metal. “21 days after the attack, molten steel was still running” said Leslie Robertson, who is one of the design engineers of WTC.

5.5 Involvement of thermite:

Out of studies carried out on the debris and dust from the collapse, it was concluded that there was presence of very effective agent of violence that was more effective than explosives – Thermite. Thermite is a chemical obtained from ferrous oxide and aluminium. Molten steel that was recovered from ground zero is the direct evidence of use of thermite. Thermite works by way of thermal heating because of which not much noise is generated. Molten spheres of metal were found in the dust of the towers all over Manhattan. To attain



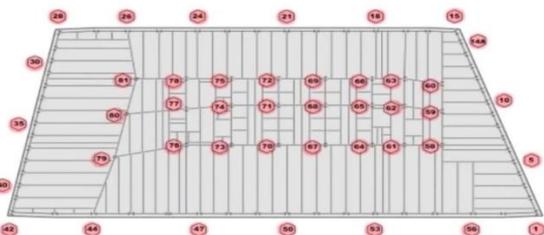
These spheres need high temperature heat which can be attained by an exothermic chemical reaction. Ground zero was the longest burning commercial building fire in US history which explains the use of thermite. Also, a team of international scientists conducted studies on the dust and found unreacted, finite thermite particles. Melting point of steel is 1371°C which can be attained by using thermite as the exothermic reaction can give

out heat up to 4000°C.

VI. ABOUT WTC BUILDING 7:

The weird fact about Building 7 is, no plane was hit yet the whole building collapsed. Official report says the reason of collapse being “fire due to furniture” which is not sufficient enough to bring down a 47 stories, steel structure. The fire was due to the debris that was laterally ejected from North and South building.

About the pattern of collapse, to attain such even and controlled collapse, all the core columns need to fail at same time which is practically impossible due to asymmetric impact. The reason for fire was given as the fire induced from the lateral ejections from adjoining North and South towers. NIST stated that the collapse of the whole building was due to failure of just one column (i.e. Column 79). Fire induced floor system was the only possibility that was considered by NIST. Talking about the fires in the tower, they were not studied in detail, as in case of north and south towers. This collapse was due to the failure of just one column, Column 79, which was said to be the support system to the above floors. However, it is reported that fire due to furniture resulted into weakening and collapse of such critical component of the tower which practically sounds absurd. The timing of the collapse also supported the conspiracy theory. It hardly took 5.4 seconds for the whole 47 storied building to come to ground i.e. near to free fall acceleration. A building of that importance and design did not provide any resistance to free fall acceleration also gives birth to doubt.



• The Pentagon :

The Pentagon is the headquarter of US security department and has 5 buildings built in ring pattern. On 11th September, 2001, the Pentagon was hit by a Boeing 757 but the hit point that was seen on the building was too small to accommodate a 100 ton jet

plane. The building is a seven floored building with height of 23.56m from ground level. The plane that crashed into the building (Boeing 757) is 13.5m in height. It is physically impossible to fly a Boeing 757 at such low altitude at a speed of 800+ kmph. The hole dimension of the damage that was caused due to impact of the plane was 9.33meters which gives birth to another conspiracy theory. A taller plane couldn't produce such small hole. The videos recovered from CCTV of Pentagon didn't show any such jet plane crashing into the building. This crash lacks logic.



VII. CONCLUSION:

Considering all the above mentioned theories, we have come to the conclusion that the attacks of 9/11 were conspiracy. The reason for undertaking the attacks have several other conspiracy stories attached to them. However, this attack have certainly had a huge impact on the whole world as several new policies were introduced by the US as a result of these attacks. If we happen to believe all the official theories that were presented as the reason for the structural failures, we would defy the basic principles of the construction industry. It would absurd the laws of structural integrity. It is rightly said that to get to the roots of such big conspiracy, 'follow the capital' related to it. Just months before the 9/11 (June 2001), the WTC's lease was sold to American Businessman Larry Silverstein. Silverstein took out an insurance plan that 'fortuitously' covered terrorism. The insurance company was taken to the court and he claimed to be paid double the amount as there were two attacks. He was later awarded \$4,550,000,000. Less than a month after 9/11, U.S. troops invaded Afghanistan in an attempt to dismantle Al-Qaeda (the terrorist group that claimed responsibility for the attacks). U.S. troops further invaded Iraq and deposed President Saddam Hussein

which was a key part of America's newly launched war on terror. After 9/11, budgets for defense-related agencies skyrocketed as well. Several other policies such as creation of a new cabinet-level federal agency, the USA PATRIOT Act of 2001, Information Awareness Office (IAO) which directly affected the privacy of US citizens. It also made the airport security more strict and alert.

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