High Explosive Nanothermite – More Bark Than Bite? No Contenders for The Nanothermite Challenge

T. Mark Hightower

Presentation for Jim Fetzer's show, The Real Deal, July 6, 2011

Note to listeners

Listeners should have been directed to this web page to view and/or download this presentation.
http://www.scribd.com/tmhightower

This article by Kevin Ryan posted to 911blogger on June 20, 2011 will be referred to during the show, “The explosive nature of nanothermite.”
http://911blogger.com/news/2011-06-20/explosive-nature-nanothermite

This article by Steven Jones also posted to 911 blogger may also be referred to, “Responses to questions regarding thermite, nanothermite and conventional explosives used in the WTC destruction.”
http://911blogger.com/news/2011-05-10/responses-questions-regarding-thermite-nanothermite-and-conventional-explosives-used-wtc-destruction

T. Mark Hightower has both B.S. & M.S. degrees in chemical engineering and has nearly 30 years of engineering experience. He has worked in the chemical industry, the space program, and for the last two years in the environmental field. He is a member of the American Institute of Chemical Engineers (AIChE), the American Institute of Aeronautics and Astronautics (AIAA), and ASTM International (formerly American Society for Testing and Materials).

He became a born again conspiracy theorist in January 2004 after stumbling upon Peter Meyer's Serendipity web site and learning that controlled demolition was a more likely explanation for the destruction of the Twin Towers than the official government story. He is a member of Scholars for 911 Truth, a petition signer at Architects & Engineers for 911 Truth, and a member of Pilots for 911 Truth.

His 911 research is done as an exercise of his Constitutional rights as a private citizen, and in no way represents his employer or the professional societies in which he holds membership. He prefers not to mention his employer in the context of his 911 research, in order to avoid any appearance of representing his employer in these matters.

Brief chronology

- August 2010, participated in conference call with Vietnam veteran with explosives experience, started researching explosiveness of nanothermite, including communicating with many top nanothermite advocates (got many email responses)
- March 2011, continued research and communications, but got silent treatment from the nanothermite advocates (only one email response from Kathy McGrade of AE911Truth)
- May 1, released paper "How indeed can nanothermite be explosive? & The Nanothermite Challenge"
- May 8, responded to criticism from Kevin Ryan
- June 4-5, 2011, attended and had a table at Conspiracy Con in Santa Clara seeking Architects & Engineers for Nanothermite Truth (aeNtruth)
- June 12, Started Facebook group for aeNtruth to spread the word about The Nanothermite Challenge.
- June 20, The due date for The Nanothermite Challenge passed without any entries
- June 23, issued Press Release, High Explosive Nanothermite – More Bark Than Bite? No Contenders for The Nanothermite Challenge
- July 4, 2011, guest on Deanna Spingola's show, Spingola Speaks http://www.spingola.com/
- July 6, 2001, guest on Jim Fetzer's show, The Real Deal http://radiofetzer.blogspot.com/

Why “The Nanothermite Challenge”

- In April 2009 the paper “Active Thermitic Material Discovered in Dust from the 9/11 World Trade Center Catastrophe ” by Harrit et al. came out
- The authors were not able to definitely conclude that what they found was an explosive, so they said they found the red layer of the red/gray chips to be a “highly energetic pyrotechnic OR explosive material.” (emphasis added)
- In April 2009 AE911Truth releases article entitled, "A ground-breaking scientific paper confirmed this week that red-gray flakes found throughout multiple samples of WTC dust are actually unexploded fragments of nanothermite, an exotic high-tech explosive."
- Same article also says, "Ordinary thermite burns quickly and can melt through steel, but it is not explosive. Nanothermite, however, can be formulated as a high explosive."

Definition of Pyrotechnic

3-3. General Behavior of Pyrotechnic Compositions. Pyrotechnics is the technology of utilizing exothermic chemical reactions that, generally speaking, are non-explosive, relatively slow, self-sustaining, and self contained. Pyrotechnic compositions are generally finely divided fuels such as metal, alloys, and hydrocarbons mixed with oxidizers.

Military Explosive, Department of the Army Technical Manual, September 1984, TM9-1300-214

The Nanothermite Challenge

- Find and document peer-reviewed scientific research that demonstrates that a gas-generating nanothermite (GGNT) based upon iron (III) oxide (Fe_2O_3) and aluminum (Al), where the gas-generating chemical added to the nanothermite is not itself a high explosive, can be made to be a high explosive with at least a detonation velocity of 2000 m/s. The author of this paper will donate [to AE911Truth] $100 for every 1000 m/s of detonation velocity that can be documented, the donation not to exceed $1,000.

Low explosives (Wikipedia)

Low explosives are compounds where the rate of decomposition proceeds through the material at less than the speed of sound. The decomposition is propagated by a flame front (deflagration) which travels much more slowly through the explosive material than a shock wave of a high explosive. Under normal conditions, low explosives undergo deflagration at rates that vary from a few centimeters per second to approximately 400 metres per second. It is possible for them to deflagrate very quickly, producing an effect similar to a detonation. This can happen under higher pressure or temperature, which usually occurs when ignited in a confined space.

A low explosive is usually a mixture of a combustible substance and an oxidant that decomposes rapidly (deflagration), however they burn slower than a high explosive which has an extremely fast burn rate.

Low explosives are normally employed as propellants. Included in this group are gun powders and light pyrotechnics, such as flares and fireworks.

High explosives (Wikipedia)

High explosives are explosive materials that detonate, meaning that the explosive shock front passes through the material at a supersonic speed. High explosives detonate with explosive velocity rates ranging from 3,000 to 9,000 meters per second. They are normally employed in mining, demolition, and military applications. They can be divided into two explosives classes differentiated by sensitivity: Primary explosive and secondary explosive. The term high explosive is in contrast to the term low explosive, which explodes (deflagrates) at a slower rate.

Further comments on high versus low explosives

Technically, the difference between low and high explosive is whether its reaction velocity is less than or greater than the speed of sound in the explosive material.

The speed of sound is different in different materials.
343 m/s in air
1497 m/s in water
6100 m/s in steel
6420 m/s in aluminum
3200-3600 m/s in concrete
366-518 m/s in cork
40-150 m/s in rubber

So this helps to explain how in the previous definitions there is the region between 400 m/s and 3000 m/s that is undefined or up for grabs, whether it is a low or high explosive, but really this will not be a problem.

In The Nanothermite Challenge I used 2000 m/s as my lowest value at which the prize would be awarded. This was a judgment call on my part.

Reaction velocities for nanothermite from the technical literature

When I wrote my May 1 paper, the velocities that I could find documented in the open technical literature for iron oxide – aluminum nanothermites were 8.8 m/s and 40.5 m/s, and for tungsten oxide – aluminum nanothermite, 7.3 m/s.

As I have also been trying to meet The Nanothermite Challenge myself, I have since found a higher value in the literature for an iron oxide – aluminum nanothermite, 895 m/s. This nanothermite is described as
“sol gel (aerogel, 70 nm Al added before gellation)”

Reference: Klapotke, Thomas E., “Chemistry of High-Energy Materials,” de Gruyter, Berlin/New York, 2011, pages 194-195
http://www.amazon.com/Chemistry-High-Energy-Materials-Gruyter-Textbook/dp/3110227835/ref=sr_1_1?s=books&ie=UTF8&qid=1309921227&sr=1-1

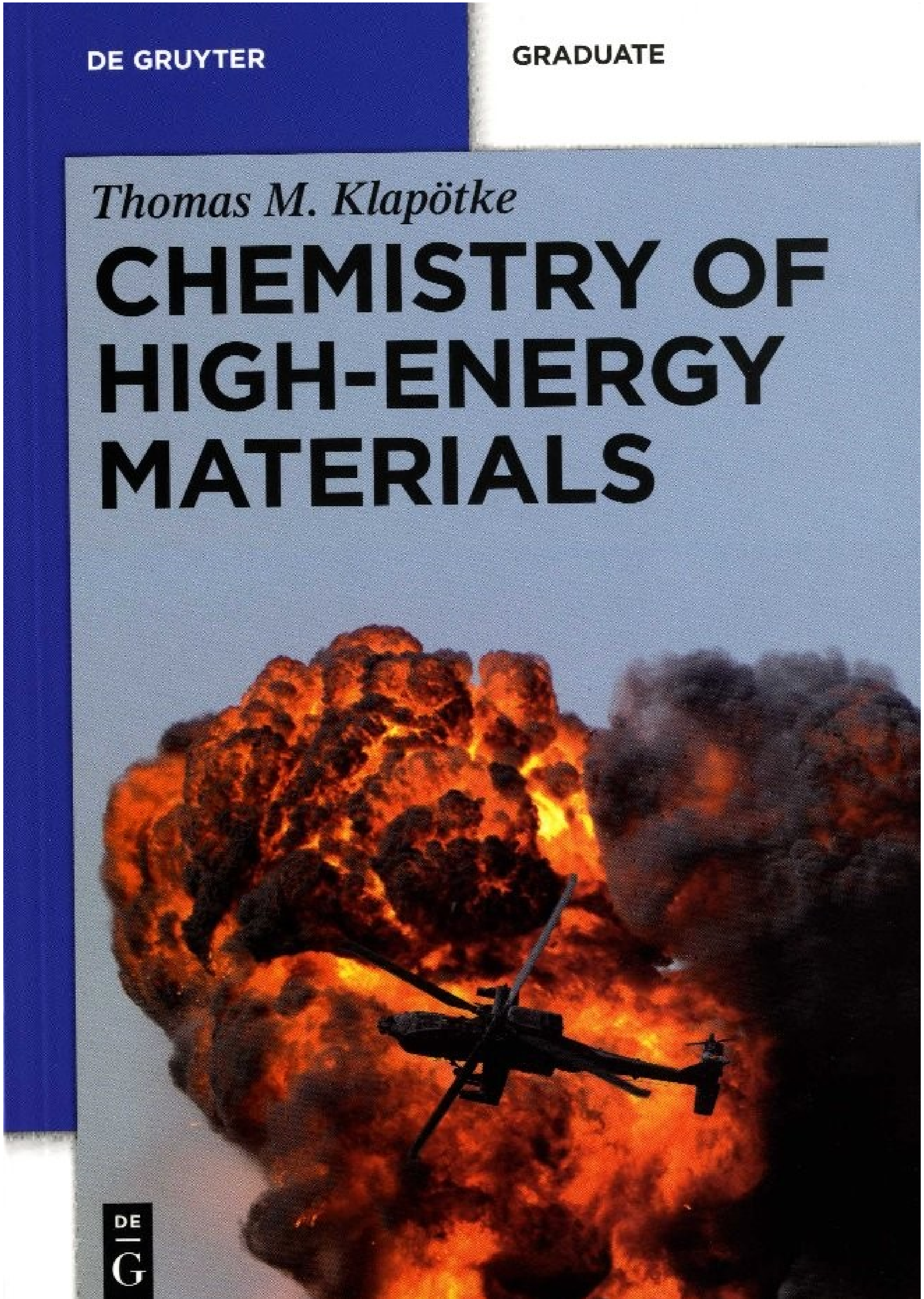
It will be shown that an explosive velocity of 895 m/s is inadequate to make “explosive nanothermite” of any significance as an explosive for the destruction of the WTC buildings.

Something of note on “sol gel (aerogel, 70 nm Al added before gellation)”

The Klapotke text on page 195 says the following about this aerogel nanothermite.

“The impact sensitivity of the aerogel thermite may make it suitable for use in primers, because all the other preparatory methods for the iron oxide thermite produce thermites are unsuitable for this application. The especially sensitive nature of aerogel thermites stems from the inability of the aerogel matrix to conduct heat, a character only applicable to aerogels, due to their insulating ability.”

Does nanothermite have an impact sensitivity issue, and how might this affect theories of WTC destruction by means of nanothermite?


DE GRUYTER
GRADUATE
Thomas M. Klapötke
CHEMISTRY OF HIGH-ENERGY MATERIALS
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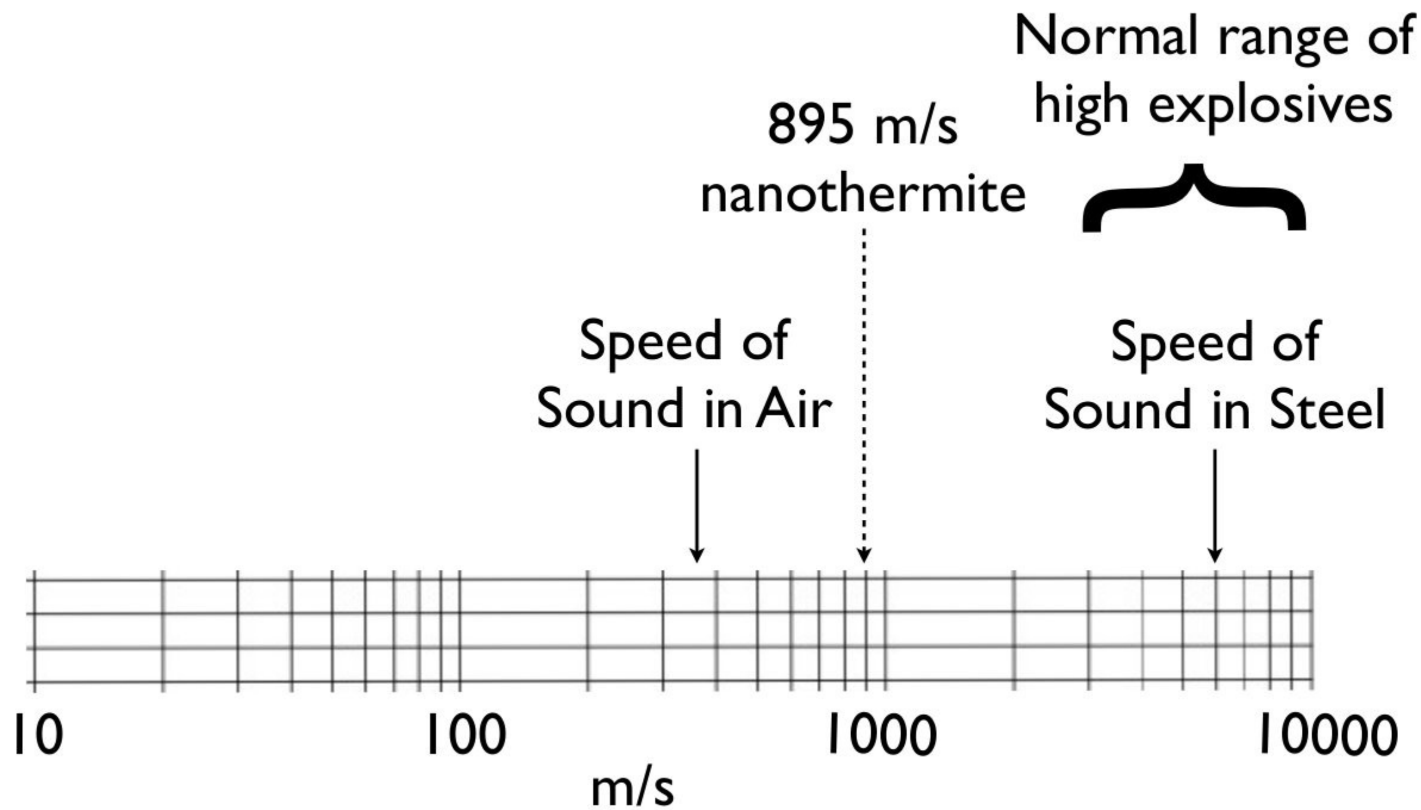
The graduate-level textbook *Chemistry of High-Energy Materials* provides an introduction to and an overview of primary and secondary (high) explosives as well as propellant charges, rocket propellants and pyrotechnics. After a brief historical overview, the main classes of energetic materials are discussed systematically. Thermodynamic aspects, as far as relevant to energetic materials, are discussed, as well as modern computational approaches to predict performance and sensitivity parameters. The most important performance criteria such as detonation velocity, detonation pressure and heat of explosion, as well as the relevant sensitivity parameters such as impact and friction sensitivity and electrostatic discharge sensitivity are explored in detail. Modern aspects of chemical synthesis including lead-free primary explosives and high-nitrogen compounds are also included in this book together with a discussion of high-energy materials for future defense needs.

The most important goal of this book, based on a lecture course which has now been held at LMU Munich for over 12 years, is to increase knowledge and know-how in the synthesis and safe handling of high-energy materials. Society needs now as much as ever advanced explosives, propellant charges, rocket propellants and pyrotechnics to meet the demands in defense and engineering.

This book is first and foremost aimed at advanced students in chemistry, engineering and materials sciences. However, it is also intended to provide a good introduction to the chemistry of energetic materials and chemical defense technology for scientists in the defense industry and government-run defense organizations.

Deflagration to Detonation



Sunday, July 3, 2011

Diagram provided by Dwain Deets

Explosive velocities & relative effectiveness factors (Wikipedia)

Explosive, Grade	Density (g/cm^3)	Detonation Vel. (m/s)	R.E.
Ammonium nitrate (AN)	1.123	5270	0.42
Black Powder, 75%KNO_3+15%C+10%S	1.700	400	0.55
ANFO, 94.3% AN + 5.7% Fuel Oil	0.840	5270	0.80
Erythritol tetranitrate	1.6	8100	1.60
TNT	**1.654**	**6900**	**1.00**
Amatol, 80% TNT + 20% AN	1.548	6570	1.17
Tetrytol, 70% Tetryl + 30% TNT	1.707	7370	1.20
Tetryl	1.73	7570	1.25
C-4, 91% RDX	1.737	8040	1.34
C-3 (old RDX based)		7924	1.35
Composition B, 63% RDX + 36% TNT	1.751	7800	1.35
Nitroglycerin	1.6	7700	1.50
RDX	1.82	8750	1.60
Semtex, 94.3 %PETN + 5.7% RDX	1.776	8420	1.66
PETN	1.773	8400	1.66
HMX	1.91	9100	1.70
HNIW (CL-20)		9380	
DDF (4,4'-Dinitro-3,3'-diazenofuroxan)	2.02	10000	
Heptanitrocubane			
Octanitrocubane	1.98	10100	2.70
Nuclear weapon yield (variable; see note)	19.1	>100000	5.2M

Estimated Relative Effectiveness Factor for 895 m/s nanothermite

The Relative Effectiveness Factor is used to compare how effective an explosive is compared to TNT.

Explosive velocity plays a role in the RE factor, but it is not the sole factor. If it were the sole factor, the RE for the 895 m/s nanothermite would be

(895)/(6900) = 0.13

In a later calculation I will use a value of 0.6 for the RE factor for the 895 m/s nanothermite, but this is just a generous educated guess on my part, for the sake of illustration.

Brisance (Wikipedia)

Brisance is the shattering capability of an explosive. It is a measure of the rapidity with which an explosive develops its maximum pressure. The term originates from the French verb "briser", which means to break or shatter. Brisance is of practical importance for determining the effectiveness of an explosion in fragmenting shells, bomb casings, grenades, structures, and the like.

A brisant explosive is one that attains its maximum pressure so rapidly that a shock wave is formed. The net effect is to shatter (by shock resonance) the material surrounding or in contact with the supersonic detonation wave created by the explosion. Thus, brisance is a measure of the shattering ability of an explosive and is not necessarily correlated with the explosive's total work capacity.

The sand crush test is commonly employed to determine the relative brisance in comparison to TNT. No single test is capable of directly comparing the explosive properties of two or more compounds;[citation needed] it is important to examine the data from several such tests[citation needed] (sand crush, trauzl, and so forth) in order to gauge relative brisance. True values for comparison will require field experiments.[citation needed]

One of the most brisant of the conventional explosives is cyclotrimethylene trinitramine (also known as RDX or Hexogen).

More on brisance

The brisance of an explosive is correlated with its detonation velocity. The higher the detonation velocity, the more brisant the explosive.

In terms of the WTC destruction, brisance would be important for turning concrete to dust.

Brisance would also be important for severing steel members, if severed by means of shock wave producing explosives (i.e. high explosives).

Alternate means of severing steel members is by means of incendiary effects of thermite or incendiary nanothermite, but this is a totally different mechanism than that of high explosives.

Candidate technologies for WTC destruction

- Directed free energy technology – Dr. Judy Wood
- Mini nukes (fusion or fission) – Ed Ward, MD, The Anonymous Physicist
- Larger nukes, Dimitri Khalezov
- Conventional high explosives
- Thermite (slow reacting incendiary)
- Nanothermite (fast reacting incendiary)
- Nanothermite (low explosive)
- Nanothermite (high explosive)
- OR ANY combination of the above

Comments on the list of candidates

- Every one is worthy of study even if you think it can be eliminated for some reason.
- Because there are so many possibilities and much evidence is uncertain, it is unlikely that any can be proven with 100% certainty unless perpetrators actually come forward.
- I have studied every one of the previously listed candidates to some extent.

My analysis today is confined to

- Conventional high explosives
- Thermite (slow reacting incendiary)
- Nanothermite (fast reacting incendiary)
- Nanothermite (low explosive)
- Nanothermite (high explosive)
- NOTE: Even Steven Jones talks about nanothermite being able to be tailored, hence the multiple entries for nanothermite
- NOTE ALSO: It is unclear exactly what AE911Truth claims with regards to nanothermite

Evidence to explain for this analysis

- Severing steel load bearing members
- Turning concrete and possibly other materials to dust
- Propelling severed structural members and dust outwards

Possible explanations (incendiaries)

- Incendiary (thermite or nanothermite) could sever steel members. Mechanism is exothermic reaction producing molten iron, conductive and convective heat transfer with phase change (solid to liquid, i.e. melting). This is a low velocity (sub-sonic) process and is relatively slow. The heat can only be transferred into the steel so fast.
- The fast incendiary nanothermite may be able to produce the molten iron faster than the regular thermite, but the process is ultimately limited by how fast you can transfer the heat into the steel. Increased spraying action might increase convective heat transfer but there is a limit to how far this will take you.

Possible explanations (low explosive nanothermite)

- Although it may be difficult to define exactly, there will become a point as the nanothermite is made to be more explosive than the fast incendiary form, that its explosiveness will actually be detrimental to its effectiveness in severing the steel member.
- Visualize the molten iron being expelled much too quickly to be effectively utilized in the heat transfer limited step of cutting through the steel, so that much of the molten iron bursting forth will be wasted.
- This low explosive nanothermite cannot cut with a shock wave like a high explosive, and it certainly cannot pulverize the concrete.
- So Low Explosive Nanothermite can be eliminated due to its ineffectiveness.

Possible explanations (high explosive nanothermite)

- High explosive nanothermite, if such a thing exists, could cut steel beams with shock waves and shatter concrete like conventional high explosives
- But as previously pointed out, the highest detonation velocity found in the literature for an iron oxide – aluminum nanothermite is only 895 m/s
- I believe that this is too low to effectively cut steel (speed of sound in steel is 6100 m/s) or pulverize concrete (speed of sound in concrete is 3400 m/s). But let's suppose it can hypothetically do these things. How much would it take compared to a conventional high explosive, based on its previously estimated RE factor. Let's do a calculation to find out.

Calculation of TNT needed to cut large WTC Twin Tower core column

P = (3/8)*A

where A is the cross sectional area of the steel member in square inches and P is the pounds of TNT required. To then get the necessary pounds of any other explosive you simply divide by the relative effectiveness factor for the other explosive.

I took one of the large core columns (outer dimensions 52 inch x 22 inch) somewhere in the middle of the tower where the thickness would be about 3 inches.

I assumed a straight cut for the sake of the calculation, even though an angled cut would require a little more explosive.

A = (52)(22) - (46)(16) = 408 square inches

P = (3/8)(408) = 153 lbs TNT

Note: Above equation is based on structural steel. If any WTC steel were of a higher or harder grade, more explosives would be necessary and a different equation would apply.

Reference: Explosives and Demolitions, FM 5-25, Department of the Army Field Manual, May 1967, pages 87-90

Calculation of 895 m/s explosive nanothermite needed to cut large WTC Twin Tower core column

Remember the Relative Effectiveness Factor = 0.6 that I had previously estimated for the 895 m/s explosive nanothermite? We simply divide the lbs of TNT necessary by this factor to determine the lbs of the 895 m/s nanothermite necessary.

153/0.6 = 255 lbs 895 m/s explosive nanothermite to sever one large core column.

I want to emphasis that I do not believe that it would be able to cut the steel at all, because the speed of sound in steel is 6100 m/s, much higher than the reaction velocity of 895 m/s, but if it could, this is the type of calculation you would do to determine how much it would take.

Since this 895 m/s "high" explosive nanothermite is likely ineffective and certainly impractical, it also can be eliminated.

So the only nanothermite we are left with as a feasible option for destruction, is the incendiary nanothermite, and it cannot explain all the data.

Therefore, for the options considered in this analysis, conventional high explosives would be necessary to explain turning concrete to dust and propelling materials outwards.

Comparing RDX necessary versus the 895 m/s “high” explosive nanothermite

To get the lbs of RDX necessary, we simply divide the lbs of TNT by the Relative Effectiveness Factor for RDX

153/1.6 = 96 lbs RDX

So if the 895 m/s “high” explosive nanothermite were used instead of RDX, it would take 2.7 times as much nanothermite than the conventional high explosive RDX.

255/96 = 2.7 times as much

Would it have made sense to use a material that required 2.7 times as much as a conventional high explosive?

Same principle illustrated for severing column would apply to pulverizing concrete. It would take 2.7 times as much, assuming it would work at all.

Calculation of linear shaped charge using RDX to cut core column

The military manual I have previous relied upon assumes a particular placement of the explosive around the member, but without the efficiency of an actual linear shaped charge.

So as a further check I consulted the literature from a manufacturer of linear shape charges. Google AES (Accurate Energetic Systems, LLC) or http://www.aesys.biz/AES-LSC-flyer.pdf

I consulted the table on page 2 for 3 inch penetration.

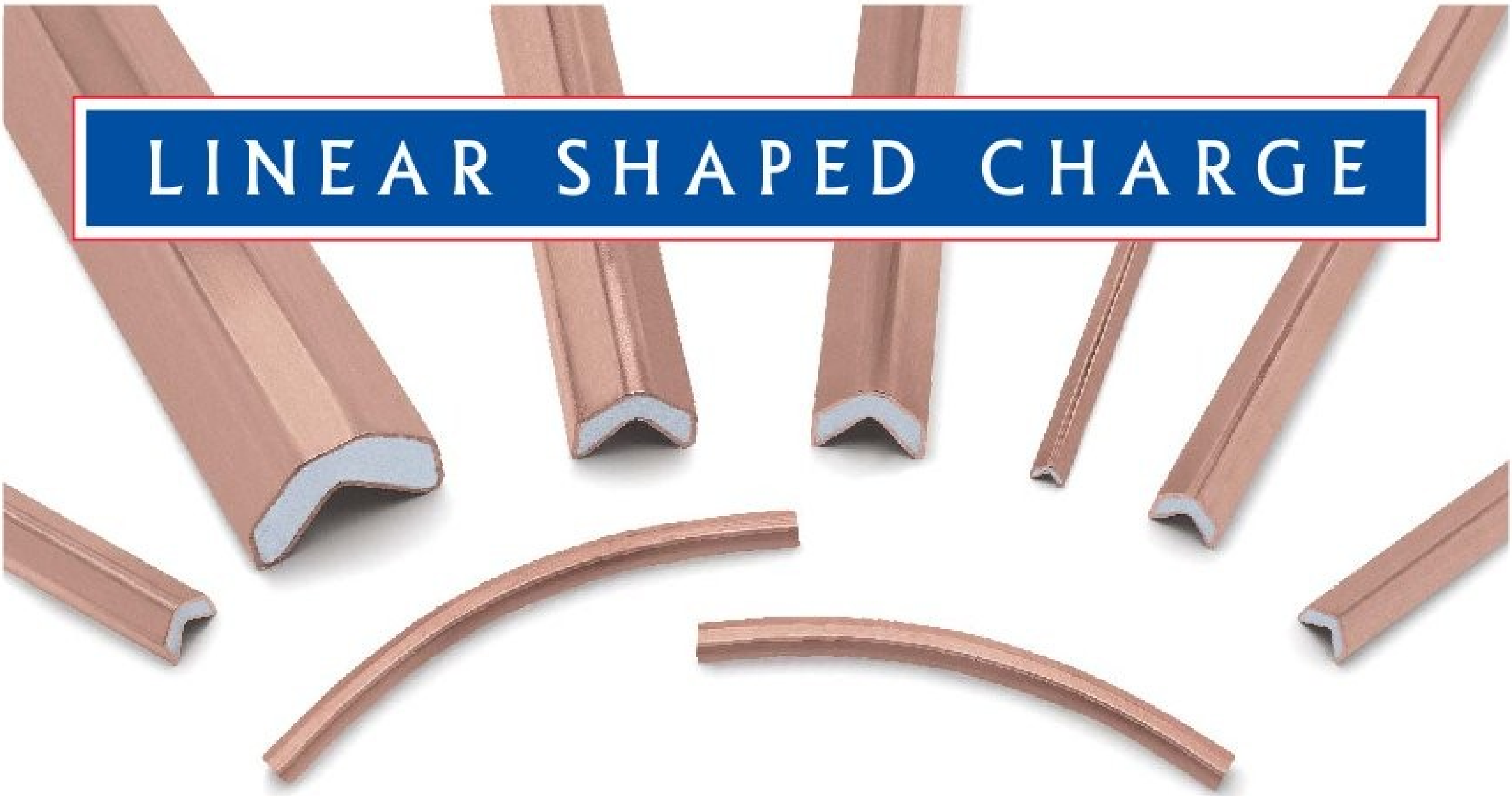
(10,500 grains/ft)(lb/7000 grains) = 1.5 lbs RDX / ft

Total length of linear shape charge required for core column = (52)(2) + (22)(2) = 148 inches

(1.5 lbs RDX / 12 in)(148 in) = 18.5 lbs RDX

Note that the total weight of the linear shaped charge is 4.3 lbs/ft.

(4.3 lbs Total LSC / 12 in)(148 in) = 53 lbs Total weight of linear shaped charge (made up of 18.5 lbs RDX and 34.5 lbs copper enclosure)


LINEAR SHAPED CHARGE

Bulk RDX versus RDX Shaped Charge

Using bulk RDX would take 96 lbs to sever column

Using RDX Shaped Charge would take total weight of 53 lbs (made up of 18.5 lbs RDX and 34.5 lbs copper enclosure)

Holding device for thermite or incendiary nanothermite

Whereas with RDX there is a way of accomplishing the destruction with simply the placement of the explosive next to and around the member (no shaped charge needed). But with thermite or incendiary nanothermite, some sort of holder is necessary to direct the reaction products, otherwise the reaction products would just run all over the place.

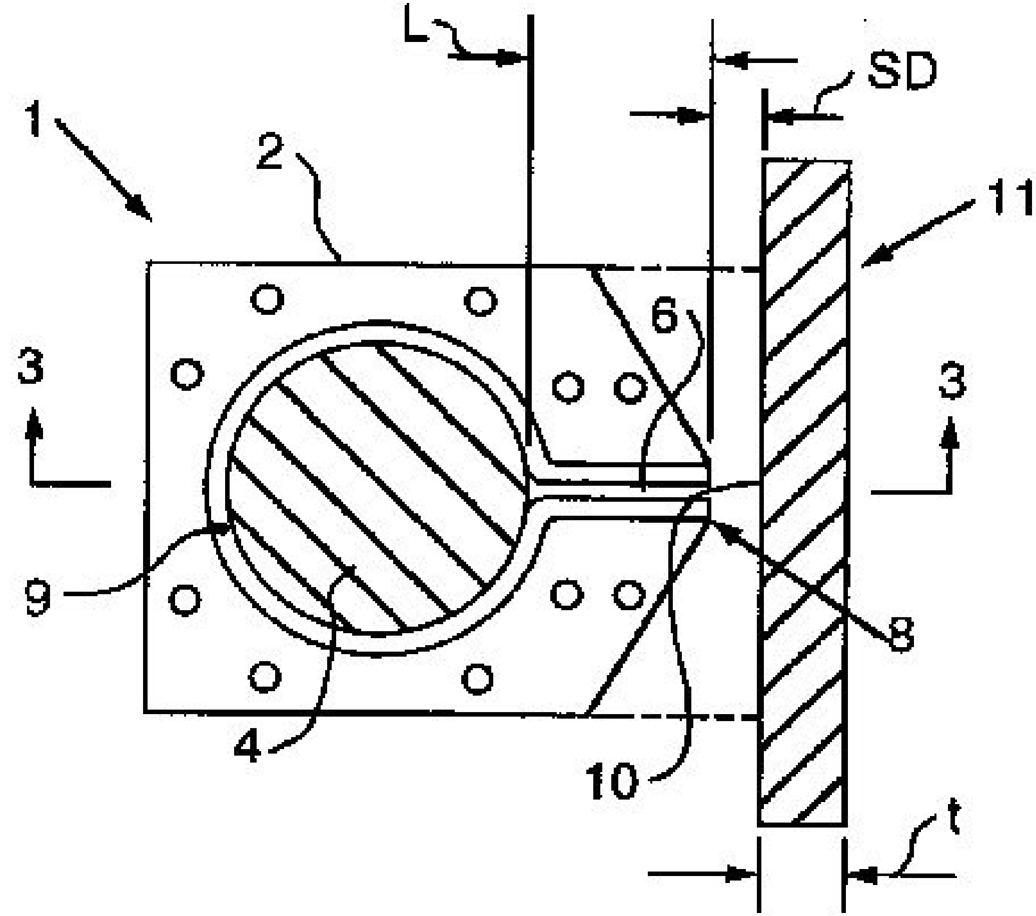
AE911Truth cites a particular patent for such a device, US 6,183,569 B1. “Cutting Torch and Associated Methods.”
http://www2.ae911truth.org/downloads/PatentUS6183569.pdf

On March 22, 2011, I inquired via email of many top nanothermite advocates if they knew how a calculation could be performed to estimate the quantity of thermite necessary to cut a column with such a device, in a manner analogous to my calculation for the conventional high explosive RDX necessary to do the job.

No one replied.

Does AE911Truth have any idea how to approach such a calculation? Could the data from Jonathan Cole's experiments be extrapolated to support such a calculation? Why aren't they interested in this?

Diagram from US 6,183,569 B1

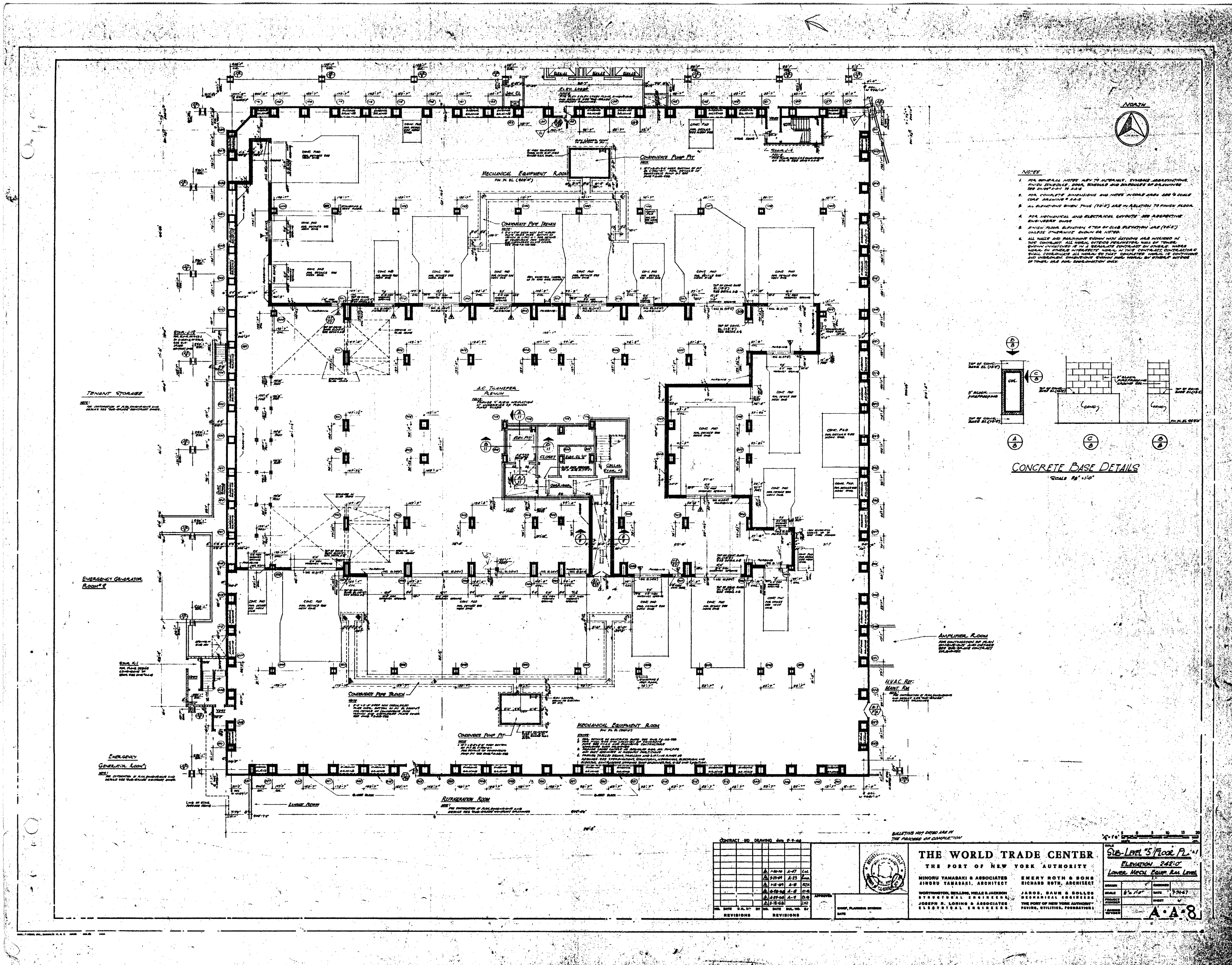


Niels Harrit's interview with Russia Today (July 2009)

http://www.youtube.com/watch?v=4RNyaoYR3y0&feature=player_embedded

In this interview Niels Harrit says, "I personally am certain that conventional explosives were used too in abundance." When asked what he meant by "in abundance," he said "tons, hundred tons, many many many tons."

Let's extend the previous calculation done for one large core column to one entire WTC Twin Tower, to get an idea if we can verify that the number of tons Niels is suggesting is reasonable.



NORTH
NOTES
MECHANICAL EQUIPMENT ROOM
CONDENSATE PUMP PIT
CONDENSATE PIPE TRENCH
A.C. TRANSFER PLENUM
TENANT STORAGE
EMERGENCY GENERATOR ROOM #2
EMERGENCY GENERATOR ROOM #1
AMPLIFIER ROOM
HVAC REF. MAINT. RM.
REFRIGERATION ROOM
CONCRETE BASE DETAILS
BULLETINS NOT DATED ARE IN THE PROCESS OF COMPLETION
CONTRACT BID DRAWING
REVISIONS
THE WORLD TRADE CENTER
THE PORT OF NEW YORK AUTHORITY
MINORU YAMASAKI & ASSOCIATES
MINORU YAMASAKI, ARCHITECT
EMERY ROTH & SONS
RICHARD ROTH, ARCHITECT
WORTHINGTON, SKILLING, HELLE & JACKSON
STRUCTURAL ENGINEERS
JAROS, BAUM & BOLLES
MECHANICAL ENGINEERS
JOSEPH R. LORING & ASSOCIATES
ELECTRICAL ENGINEERS
THE PORT OF NEW YORK AUTHORITY
PAVING, UTILITIES, FOUNDATIONS
CHIEF, PLANNING DIVISION
APPROVED
SUB-LEVEL "5" FLOOR PL.
ELEVATION 242'-0"
LOWER MECH. EQUIP. RM. LEVEL
A-A-8

Spreadsheet "ExplosivesRequiredCalcExcel.xls" Assumptions

lbs of TNT necessary to sever member given by equation P = (3/8) A where A is cross sectional area of member in square inches and P is pounds of TNT required. This equation is from FM 5-25 Department of the Army Field Manual, Explosives and Demolitions, 1967, available on the internet.

There are 16 large core columns measuring 52 in x 22 in outside dimensions with thickness varying from 6 in at floor 1 to 0.5 in at floor 110, the thickness varying linearly from floor 1 to floor 110. Different values of the floor 1 thickness and floor 110 thickness can be entered into the spreadsheet and all values in between will be automatically adjusted to be linear within the range.

There are 31 small core columns measuring 36 in x 12 in outside dimensions with thickness varying as indicated in the spreadsheet below. Same further comments from above large core description apply here and to the following as well.

There are 240 perimeter box columns measuring 14 in x 14 in outside dimensions with thickness varying as indicated in the spreadsheet below. The members are assumed to be cut at every floor. The lbs TNT is calculated per floor in the right most column of the spreadsheet, and totaled at the bottom. Values are expressed in lbs, tons, and kTons. The quantity of RDX required is also calculated by dividing by 1.6, the relative effectiveness factor for RDX.

I don't recall reference for column thicknesses. May have been http://911research.wtc7.net/ and/or estimates.

Spreadsheet & Results

Floor	Large Core Thickness inches	Small Core Thickness inches	Large Core CS area Inches^2	Small Core CS area Inches^2	Perimeter Thickness inches	Perimeter CS area Inches^2	Total CS area Inches^2	TNT Required per floor lbs	
1	6.0	4.0	11904.0	9920.0	3.0	31680.0	53504.0	20064.0	
2	5.9	4.0	11823.1	9851.6	3.0	31503.3	53178.0	19941.8	
3	5.9	3.9	11741.9	9782.9	3.0	31325.7	52850.5	19818.9	
4	5.8	3.9	11660.3	9713.9	2.9	31147.0	52521.3	19695.5	
5	5.8	3.9	11578.5	9644.6	2.9	30967.3	52190.4	19571.4	
6	5.7	3.8	11496.3	9575.0	2.9	30786.6	51857.9	19446.7	
7	5.7	3.8	11413.7	9505.2	2.9	30604.9	51523.8	19321.4	
8	5.6	3.8	11330.9	9435.0	2.8	30422.2	51188.1	19195.5	
9	5.6	3.7	11247.7	9364.6	2.8	30238.5	50850.8	19069.0	
10	5.5	3.7	11164.2	9293.8	2.8	30053.8	50511.8	18941.9	
FLOORS 11 THROUGH 100 SPREADSHEET VALUES NOT SHOWN									
101	1.0	0.6	2201.1	1626.6	0.7	9015.2	12843.0	4816.1	
102	0.9	0.5	2087.6	1528.9	0.7	8737.6	12354.1	4632.8	
103	0.9	0.5	1973.8	1430.8	0.7	8458.9	11863.6	4448.8	
104	0.8	0.5	1859.7	1332.5	0.6	8179.3	11371.4	4264.3	
105	0.8	0.4	1745.2	1233.8	0.6	7898.6	10877.6	4079.1	
106	0.7	0.4	1630.4	1134.9	0.6	7616.9	10382.2	3893.3	
107	0.7	0.4	1515.3	1035.7	0.6	7334.2	9885.2	3706.9	
108	0.6	0.3	1399.9	936.2	0.5	7050.5	9386.5	3519.9	
109	0.6	0.3	1284.1	836.4	0.5	6765.7	8886.2	3332.3	
110	0.5	0.3	1168.0	736.3	0.5	6480.0	8384.3	3144.1	
							lbs	1342383	838989
							Tons	671	419
							kTons	0.67	0.42
								TNT	RDX

Spreadsheet Totals for All Floors

lbs	1342383	838989
Tons	671	419
kTons	0.67	0.42
	TNT	RDX

Interpretation of calculation

Keep in mind that this calculation assumed cutting the columns at every floor. The results can easily be adjusted for other cases. For example, if instead they were cut every third floor, you would just divide the results by 3.

The explosives necessary for complete pulverization of concrete were not included in the calculation.

Horizontal members would also need to be cut, but explosives for this were not included in the calculation.

Use of shaped charges would decrease the quantity of actual explosives needed by 81 percent, although the total mass needed would only decrease by 45 percent, owing to the mass of copper needed in the shaped charges.

The previous spreadsheet calculations tend to support Niels Harrit's estimate that perhaps 100 tons of conventional explosives were needed. If adjustments were made for those things not included in the calculation, the amount required would probably be in the hundreds of tons.

Results of web search for “explosive nanothermite”

The simple fact that it explodes makes an even stronger case for explosive nanothermite does it not?

Nanothermite: High-Tech Explosive Material Found in 9/11 Dust

Scientists did and found a very advanced explosive: Nanothermite.

Explosive Nanothermite found in WTC Dust. The stuff can be mixed together with paint and then applied to walls, beams, anything. …

Now, according to this advertisement, it would seem that they found a high explosive nanothermite in the dust from Ground Zero.

Gage announced how the ubiquitous presence of the government-developed explosive, nanothermite, was found at Ground Zero. …

Based on two years of intensive research, this paper reveals that tons of tiny particles of the high-explosive nanothermite were present …

... the discovery by a team of scientists of a highly-explosive nanothermite compound in the collapse of buildings from the WTC on 9/11, and more. ...

More

... to the use of a high-tech military explosive (nanothermite) in the vertical free-fall collapses of the Twin Towers and Building 7. …

... a peer-reviewed scientific journal in 2009.107 Being both an incendiary and a high explosive, nanothermite is one among several types of …

Military grade explosive "Nanothermite " was used to destroy the Twin towers using the science of controlled demolition. …

As we saw above, in the past year new scientific information has pointed strongly to the use of a high-tech military explosive (nanothermite) in the …

... study that confirms that dust from 4 locations near the World Trade Center contained residue from the high tech explosive nanothermite. …

We are talking about military grade nano thermite not a conventional …

The U.S. military and intelligence community, not al Qaeda, had access to the sulfur-enhanced super-military-grade nano-thermite (thermate) detected in the WTC dust needed to melt the steel found molten deep in its basement levels as long as two months later

Conclusions

- Only conventional high explosives and incendiary thermites (regular & nano) remain as reasonable options
- Low explosive nanothermites were eliminated due to ineffectiveness
- “High” explosive nanothermites were eliminated due to low detonation velocity rendering them ineffective and impractical
- Calculations suggest that if conventional high explosives alone were used to destroy a WTC Twin Tower, that on the order of hundreds of tons might be required
- NOTE THAT this analysis did not consider other candidates such as directed free energy or nukes

Seeking feedback

- I am considering having a New Nanothermite Challenge to be concluded in advance of the 10 year anniversary of 911.
- If I do this, how should it be different than the original one?
- Should the beneficiary of the award be an organization different than AE911Truth?
- Are any others willing to put up prize money?
- Should the low end cut off be lower, like 1000 m/s instead of 2000 m/s?

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Web site for Architects & Engineers for Nanothermite Truth may eventually be established at
http://www.aeNtruth.org/