Public Comments:

A Structural Reevaluation of the Collapse of World Trade Center 7 – Draft Report

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INE Report 18.17

Note: The following are public comments which are presented in the order that they were submitted. Names and contact information of commenters have been removed.

There was video of substantial WTC7 lobby damage earlier in the day, and witnesses like Barry Jennings reported internal explosions earlier in the day which he reported (paraphrasing) “cut his stairwell landing” and “blew an elevator car into the hallway”. Did the UAF study consider any prior damage or structural derangement aside from fire? Did you model for the concrete stairwells, and if not, would their presence or absence contribute significantly to expected collapse sequences?

In your report, the penthouse fell a few seconds before the main structure, and I was wondering what the reason could be for that sequence. I see an antenna on the roof, but could not get a clear picture of it. Do you have a list of what antennas were installed on the roof of building 7? There had to be several antennas installed on the roof considering it was housing the command center for the city of New York. Many of the Firemen and Policemen have talked about the faulty Motorola Radios. Did all transmissions go through the command center, and could another “transmitter” on the roof cause interference with these radios on that day? I would guess if the type of antenna that I am theorizing was used, probably wouldn’t be on the list anyway, but if you had a diagram or better picture of the roof right before its collapse, there could be a few more questions presented. I have looked at pictures of the roof of the twin towers and the pentagon, and someone suggested that an antenna was positioned in one of the construction trailers in front of the pentagon, so they may have been disguised. In final, my question, what antennas were located on the roof of building 7 just prior to collapse?

It is critically important that it be presented in meticulous scientific detail to the rest of the world. Please note that Page 73 of the PDF contains a typo: Whereas NIST asserted that the differential westward displacement of girder A2001 relative to Column 79 was 5.5 inches and later revised its calculation to 6.25 inches, we found that the westward displacement of girder A2001 relative to Column 79 would have been less

than 1 inch under the fire conditions reported by NIST (Figure 2.66). I believe that should be Figure 2.65 as there is no Figure 2.66 in the draft report.

In your testing did you simulate the damage from the bottom corner of south side of WTC 7 that was caused when the other 2 buildings collapsed?

Thank you for your comprehensive and persuasive draft report.

Please accept these comments in the spirit of improving it.

(1) page 36 - reference to Figure 2.15 omitted

Column 79 at Floor 13 was a built-up column consisting of W14×730 and two steel plates 2 inches thick by 26 inches wide welded on the sides. Figure shows the cross section of Column 79. Figure 2.16 shows the mechanical properties of steel against temperature

(2) page 47 - singular plural verb noun agreement - “Figures … show”

solid elements. Figures 2.28 and 2.29 below shows the modeling of the floor slabs for the calculation of the equivalent material in another direction. That is, the floor slabs of WTC 7 had

(3) page 55 - reference to Figures 2.39 and 2.40 omitted, unnumbered figures appear duplicated

Seven types of connections were modeled using ABAQUS.

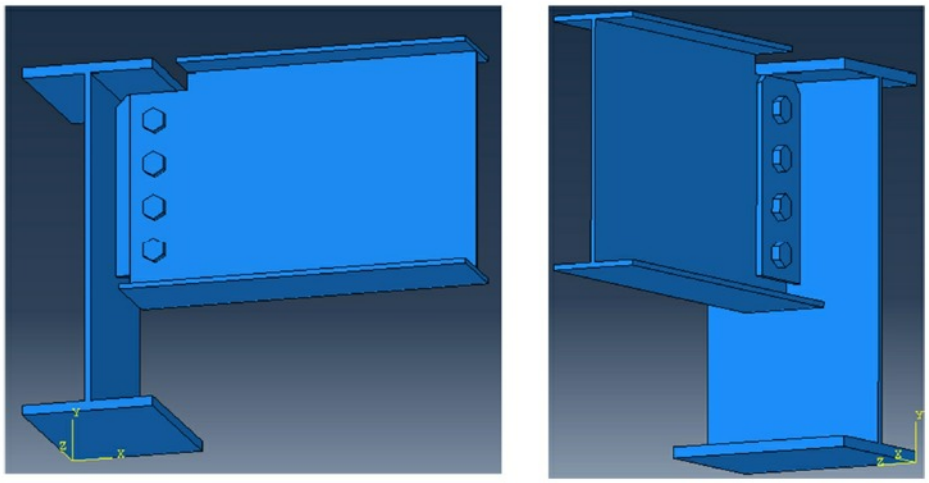

Figure is a fin connection sample between an interior girder and a beam. Figure is the

(4) page 75 - singular plural - “these phenomena” or “this phenomenon”

2. NIST assumed that shear studs on beams K3004, C3004, B3004, A3004, and G3005 were broken due to differential thermal movement. We analyzed this phenomena in our previous analyses and found that this would not have occurred.

(5) page 75 - singular plural - “these phenomena” or “this phenomenon”

4. NIST assumed that the bolts fastening girder A2001 to its seats at columns 44 and 79 were broken. We analyzed this phenomena in our previous analyses and found that this would not have occurred.

(6) page 79 - strange formatting

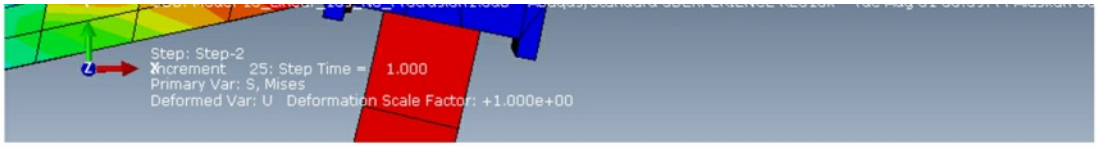

Figure 3.6 Plan view shows girder A2001 being pushed laterally past notched western side plate.

My remaining comment concerns the written style alone, for your consideration.

(7) pages 5, 45, 65, 74, 90 - “Substitute 'damn' every time you're inclined to write 'very;' your editor will delete it and the writing will be just as it should be.” Mark Twain

I look forward to your 3D data being made available. Thank you again for your report.

In the last paragraph of your project summary, there is a grammatical error. Perhaps fixing it would give the report more credibility: “with the final report will (should be “to”) be released later this year.”

This guy is expressing my questions far better than i could...
https://www.metabunk.org/sept-3-2019-release-of-hulseys-wtc7-draft-report-analysis.t10890/
what about these strange visualisations or animations? How could they be explained? I am convinced that WTC7 did not collapse due to fire, but these videos by Hulsey’s team are also causing question marks.

I have a masters in architectural engineering from MIT. I'm unwilling to reveal my identity out of fear of losing my job (sorry, I have a family to feed). It is my belief that nearly all engineers are aware that WTC7 was brought down using some form of controlled demolition technology. The vast majority of us simply keep quiet out of fear of repercussions. I hold this belief for two reasons: 1. All of my colleagues with whom I have an especially close relationship have confided in me their understanding that WTC7 was demolished using some form of controlled demolition technology. 2. Only a very rudimentary understanding of physics or building engineering is required to see that WTC7 was demolished using some form of controlled demolition technology. I would like to sincerely thank AE911Truth and Prof. Hulsey & his team for their courage and hard work. Despite my unwillingness to reveal my identity, I will continue to make anonymous annual monetary contributions. Thank you

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Do you intend to publish these findings in a formal publication and/or have this study formally peer reviewed?

Hi from Denmark is it possible that if explosives may have been used the office fires may have only be initiated around the explosives?????

On page 62 of the draft report you write: „The WTC 7 fire loading analysis was based on NIST’s fire modeling for Floors 12 and 13, which we reviewed and determined to be a reasonable worst-case scenario.“ NIST NCSTAR 1-9 shows photographic evidence, however, that the fires in the north-east corner of floor 12, that would have been essential for the fire-loads assumed by NIST, had already burned out at about 3:44 pm (figure 5-134 on page 220, corroborated by figure 5-141 on page 228 and figures 5-168

and 5-172 on pages 252 and 253 respectively). NIST docoments: „The observed fire activity gleaned from the photographs and videos was not a model input, and thus one should not expect a perfect correspondence between predicted high temperatures and observed fire activity.“ (p. 378) NIST also comments on the fact, that „the burning time near the north face was longer in the simulation than in the visual evidence“ (p. 382) without acknowledging that the empirical evidence renders the simulated assumption concerning fire-loads on the steel-members of the 13th floor rather implausible.

What was the significance of the jerk implied by figure 4.23? [Velocity comparison between Chandler measurement (green plotted line) and UAF simulation (red plotted line). Bold green trend line illustrates free fall.] Downward acceleration at 1 g for 2.5 seconds. Then jerk. Downward acceleration continues at 1/2 g for 3/4 second. Another jerk. Then acceleration is 0: constant velocity of -31 m/s. 2. Per Draft Report, assume all columns on 8 floors taken out. This would indeed reproduce the 2.5 seconds of free fall. Then major jerk. Why don't we see video results of high order damage ejected from the 8 floors? (Similar to the violent lateral ejections seen on video of WTC 1 and 2.) Prior to free fall, do we even see windows blowing out over the 8 floors? 3. Is the conclusion that all columns over the whole building were taken out? Or just over the 8 floors? The Draft Report is confusing on this issue. 4. How much damage would you expect from the above mentioned jerk? For example, suppose all columns were taken out over the 8 floors. Then the building above follows in free-fall -how much damage on impact? Could that account for final state of building?

Apart from a few minor typographic issues and at least 1 unnumbered figure which I’m sure you will pick up in finalisation of this report, I restrict myself to two areas.Chapter4Specifically -and forgive me if it should have been clearer to me from the report -I do not fully understand (a) how the floor slabs were modelled in the global collapse model, and (b) what is supposed to have happened to the considerable volume of material (primarily steel and concrete) collected at the base of columns 79/80/81, and (c) how you modelled the boundary conditions to represent the structure below floor 4?So we’re clear, I am a mechanical engineer by background, I don’t claim to be an expert in structural collapse of buildings. That said, it seems to me that the collapse of a sizeable part of each floor below the east penthouse would have resulted in quite a large amount of debris. Is it possible that this falling debris led to lateral loads sufficient to cause secondary collapse? That in turn brings me to the lower floors, already compromised by the known damage from Twin Towers’ earlier collapse. Is it possible that the falling debris, together with the prior weakening of the lower floors, together with the “compromised” nature of the lower floors’ design (due to the substation) might be so as to allow for progressive collapse of the lower parts of some of those columns, such collapse then “propagating upwards” leading to the observed failure? From an examination of other video such ashttps://youtu.be/8WNk674LZrI?t=50 it is apparent that WTC7 did not fall vertically quite as modelled, but instead somewhat imploded - there’s appreciable angular displacement of the outer corners visible on that footage, suggesting a slightly different set of circumstances to those modelled. Even Figure

4.24a (simulation video) plainly does not match the actual footage. Looking at the left (as that video is shot) face of the facade, there is deformation and window breakage down to at least floor 35 directly following the east penthouse collapse. There's a notable displacement field across the entire elevation over those critical seconds, suggestive of progressive internal collapse leading to a "tipping point" effect.Athttps://youtu.be/8WNk674LZrI?t=72 it is clear that the elevation has displaced considerably. Damage Modelling Generally How was the actual damage prior to collapse accounted-for? Is it possible that some damage had already occurred to, say, the lower parts of Column 79 prior to the effects of fire? Furthermore, how was the effect of the apparently completely-destroyed Column 20 modelled? Seehttps://wtc7fact.wordpress.com/2014/01/31/world-trade-center-7-the-gash/for a discussion of the evidence of considerable damage there. The question must be whether there was collateral damage to, say, Column 69 and even the integrity of many of the girders in that area? It seems NIST also did not consider the effects of Column 20 damage; did your team go back to primary sources to establish pre-collapse damage? From my own experience, and your work, the importance of boundary conditions cannot be overstated. The evidence in the public domain of substantial damage (sufficient to have removed an entire column) does suggest that the boundary conditions in your own work may perhaps have also been not quite correct? If the perimeter of each floor is in effect compromised, the expansion field at floor 12/13 might look rather different? Would that have been sufficient to lead to the necessary deflection to unseat the connection at Column 79?I applaud your hugely detailed modelling work. I'm primarily concerned that the state of the building as-was (after impact damage from WTC1/2 but before fire) was not the same as that represented in your models. That being so, my fear is that a great deal of what follows on from that mis-match might be sufficient to obviate some of your results, or at the very least cast sufficient doubt over them as to prevent them from having the impact they might otherwise have.

There is so much evidence relating to the Nano Thermite recovered from the dust and powder and debris from ground Zero and from the surrounding area of the 911 is this discussed in your findings?

What I do wonder is what is the ultimate goal of this re-evaluation? We know that if this was an event perpetrated upon the public for unscrupulous reasons, it will be a difficult thing to unravel in the minds of the patriotic masses. I wish you well with any endeavor.

Review comments, Sept 27th, 2019, to the draft report: "A Structural Reevaluation of the Collapse of World Trade Center 7" by J.L. Hulsey et al., Sept 3rd, 2019 This report provides a thorough analysis of what may or may not have caused the collapse of building 7 of the World Trade Center complex on Sept 11th, 2001. It demonstrates that previous reports about the collapse, specifically including the NIST report, suffer from substantial shortcomings and omissions, including the flexibility of the exterior wall, the stiffeners at the girders' ends, the studs that connected steel and concrete slabs, and

the unrealistic building deformation during the collapse. By addressing these shortcomings, the current report provides a more realistic analysis as a solid basis for its conclusion that the collapse of the building could not have been caused by fire, but instead was more likely caused by near simultaneous failure of nearly all columns. There are a few issues, both major and minor, as listed below that should be addressed in the report. Major comments: 1. On p.63 (PDF p.75) section 2.6.1 states: “Note that the models in this analysis consist only of Floors 12 and 13.” It is not clearly stated anywhere in the report whether the restraint on column 79 by adjacent floors 11 and 14 was included in the analysis. It should be made clear whether, and if so, how that restraint by adjacent floors is included. If the restraint by adjacent floors on column 79 was not included in the analysis, this would be a major shortcoming of the analysis that would undermine the final conclusion. 2. On p.64 (PDF p.76) the analysis result is described: “The displacement at Column 79 in the x-direction was 1.915 inches east (and not west), and the displacement at Column 79 in the y-direction was 0.7293 inches.” On p.71 (PDF p.83), the displacement relative to Column 79, this time assuming the NIST conditions including a rigid exterior wall, is reported to be 5.11 inches westward. This displacement is more than twice as much as the displacement found on p.64, while in both cases Column 79 is at a similar distance to the rigid part of the building model (i.e. the elevator shafts and the exterior wall, respectively). It would be appropriate to provide a clarification for this substantial difference in displacement, such as e.g. the difference in temperature on the east side compared to the west side of the column. But no clarification at all is provided in the report. 3. On p.5 (PDF p.17), the executive summary states: “columns 79, 80, 81 failed at the upper floors near the penthouse.” In section 4.3, these upper floors are specified as “Floor 45 all the way up to the penthouse”, which would add up to maximally 4 floors for a 47-story building with a penthouse. However, in videos that show the collapse of the penthouse, shattering windows are visible immediately after the penthouse collapse down until roughly 8 to 11 floors below the penthouse. It is important to include at least a hypothesis in the report that can explain both the collapse of the penthouse as well as these breaking windows in lower floors immediately after the penthouse collapse. 4. On p.91 (PDF p.103), section 4.1.1 states that “differential movements in the exterior would be extremely likely to have caused window breakage, cracking of the façade, and exterior deformation, none of which were observed”. But window breakage is in fact observable clearly and abundantly. So this statement is incorrect and should be adapted. Minor comments: 5. On p.2 (PDF p.14), the executive summary states: “Near simultaneous failure of every column explains the collapse (secondary conclusion).” This statement should include that the “near simultaneous failure of every column” does not include the initial failure of the columns 79, 80 and 81 that caused the penthouse collapse nearly seven seconds before the final collapse of the building. 6. On p.55 (PDF p.67), section 2.5.2.1 starts with a Figure without caption and with 3 sentences that contain references to two Figures without mentioning the Figure numbers. 7. On p.66 (PDF p.78) the caption of Figure 2.57 refers to “displacement in the vertical direction”. However, the figure shows displacement in the horizontal North-South direction. The vertical direction is orthogonal to the viewed plane. Figure 2.56 shows the horizontal displacement in East-West direction.

Is it correct to say that the collapse of WTC7 was caused by "the near-simultaneous failure of every column in the building"? it's my understanding that this was true for eight floors but not all of the floors in the building. I.e., what was the time between the first column that failed in the very last? (excluding the isolated unrelated event at the East penthouse). I doubt that this would qualify as “near simultaneous”. The language in the abstract and/or executive summary should probably be corrected.

First of all I´d like to thank you very much for your great work. I am a German citizen and run the weblog https://wunderhaft.blogspot.com, where I translate particularly geopolitical and historical analyses of renowned scientists and journalists from English into German. I guess to be the first and only one who published your announcement of the final report on "A Structural Reevaluation of the Collapse of World Trade Center 7" into German (https://wunderhaft.blogspot.com/2019/09/eine-strukturelle-neubewertung-des.html) and I would like to know, if there are any considerations about a German edition of the final version of this report after you have published it in English? If so, I´d like to know who is in charge of this work and furthermore when and where this edition is to appear and will be available. If not, it would be a pleasure for me to work on the translation, btw. to perform this work.

I understand that you team has reached the conclusion that World Trade Center Building 7 collapsed on September 11, 2001 due to a controlled demolition rather than as a result of the attack on the World Trade Center Buildings 1 and 2. I am not an engineer nor a physicist, nor have a read the report, but I would like to ask a couple of simple questions -1. Was the fact that the collapse of Building 1 and 2 each would have caused a local earthquake which, in turn, would have had a impact on the structure of Building 7 and, potentially, could have weakened its structural columns so that they would have collapsed? 2. Did you investigate if Building 7 had flaws in its design or construction so that it would be vulnerable to collapse if it were subjected to the stress of the high level of energy created by the collapse of Towers 1 and 2.? 3. My understanding is that your report had two primary conclusions -1. the heat from the fires at the World Trade Center site was not sufficient to cause Building 7 to collapse and 2. that it, therefore, must have collapsed due to a controlled demolition. If this be the case why did you 1. commit the logical fallacy that if one thing is true, therefore, another must be true and 2. why is there no sound recording of the explosives in building 7 going off prior to its collapse? Unless there is such a thing as silent explosives, you cannot logically or scientifically claim that Building 7 collapsed due to a controlled demolition

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You put a lot of work in that. But like all investigations and reports before, I think you underestimate the damage to the south side of the building. I'm not sure why, everybody is underestimating this. Because it's pretty obvious from what documents are there: https://i662.photobucket.com/albums/uu347/911conspiracytv/GZ_WTC7_South_Tom_Franklin2.jpg http://www.911myths.com/html/wtc7_damage.html It's likely that something

like what happened to the Deutsche Bank Buliding happened to WTC7. A big chunk of WTC1 debries sliced through the south front of WTC7 and was finally stopped at one floor. (And from the pictures it seems to be a lower floor) That floor (and probably one or two above) could have been sheared towards that stopping point, buckling a lot or all the columns to the above and below floors. Together with the fires, that could have brought that building down. You might be able to calculate such a scenario.

In the acknowledgments the following paragraph appears: "In addition to the university and its personnel, we would like to thank Architects & Engineers for 9/11 Truth (AE911Truth) for providing the funding to conduct this research. We also want to thank John Thiel for approaching Dr. Hulsey to conduct this research as well as the independent, external reviewers who will review this report during the forthcoming public comment period." Comment: Richard Gage should be mentioned by name in this paragraph.AE would not be in existence where it not for his efforts on its behalf. 2.On page 2 of the Executive Summary the following paragraph appears. "Near-Simultaneous Failure of Every Column Explains the Collapse. The secondary conclusion of our study is that the collapse of WTC 7 was a global failure involving the near-simultaneous failure of every column in the building" Do not understand the need for the use of the "near" qualification to simultaneous. My read of the report failed to locate an explanation of this term. From my view of the collapse, the failure was uniform and designed to bring the building down at near free fall speed into its footprint. In that context, near appears to be appropriate. Would revise the paragraph to read: "Simultaneous Failure of Every Column Explains the Collapse" "The secondary conclusion of our study is that the collapse of WTC 7 was a global failure involving the simultaneous failure of every column in the building; i.e. controlled demolition." For support of the conclusion that the bring down was by controlled demolition research the opinion of Danny Jowenko. Danny paid for that opinion with his life. He deserves to be mentioned. And the report deserves the punch line. Note to AE: if Prof. Hulsey will not make the conclusion that controlled demolition was used, suggest, in addition to a cite to Danny Jowenko, you get Dr. Steven Jones to offer the opinion or cite his white paper titled "Why Indeed Did the World Trade Center Buildings Collapse" Griffin, David Ray, and Scott, Peter Dale, 9/11 and American Empire, Intellectuals Speak Out, Interlink Publishing Group, Northampton, MA 01060 (2006), ISBN 978-1-56656-659-9 (pbk), page 33.

Overall, Leroy's (UAF team) study is excellent and so exciting to see this about ready to be released to the world. My comments are mainly centered on Chapter 5: Examination of the building collapse. I think it is great that the UAF team examined the various scenarios of partial collapse and global collapse. I see the conclusion that the WTC 7 collapse could not have been a "progressive collapse" but rather a global collapse initiated by severing all the columns on the 13th or the 19th floor. Per the report the SAP 2000 FEM program is used to model the building collapse and presumably generate the animated model. It would be very useful to expand the narrative further and describe the theory and capabilities of the SAP2000 program. For example:(1) How does the

program model the collapse? Does the model include the full structure with all the connections allowing modeling the linear as well as non-linear behavior of the materials/ connections etc? Or were there simplifications made based on the prior analyses of the components that UAF made?(2)The program presumably models the deformation of the building as elements yield and buckle and that is how the team arrived at the conclusion that if the columns 79, 80 and 81 are removed, the building would lean to one side rather than collapse into its footprint.(3) Upon removal of the columns on the 13th floor in the mode;, does the program actually model free-fall of the upper stories of the building and the impact generated on the columns or impulse momentum forces? This then causes the upper levels to crush and buckle the columns traveling up the building and unzipping the connections as this happens.

How big was the influence of AE9/11truth on your study? Because for AE9/11truth the controlled demolition was a fact before they contracted Dr Hulsey with the study. They said they have proof before the study. Which would make the study redundant. How much proof do you need? One proof would be enough, right?

Since they're already sure what happend that day, the study is sort of biased, since AE9/11truth paid Dr Hulsey's sallary. I would think that they have an interest, that your study turns out in their favor. That is why it is important to know, how big their influence on your study was. The problem is, that whatever you say, for example that they had no influence, how can I be sure that this is true? Your study is therefore not independent and unbiased.

I'm a 32-yearsold German who follows the discourse about the September 11 attacks with great interest. I would like to draw the attention of Professor Hulsey and his doctoral students to the criticism of a German nuclear physicist named Dr. Holm Gero Hümmler who published a strong criticism of the study on his Internet blog.Dr. Hümmler's criticism is in German, but I took the trouble to translate his whole article into English and would now like to send it to you. Although his article is full of polemics, there are still some interesting arguments in it. In his blog article, Dr. Hümmler quotes two other critical comments on Professor Hulsey's study. These two sources are: 1) West, Mick: Some Problems with the UAF/Hulsey/AE911Truth WTC 7 Draft Report. Published on Youtube on September8, 2019.Online here: https://www.youtube.com/watch?v=7OClixCTdDw2)Kostack Studio: UAF WTC 7 Evaluation Simulation Plausibility Check (Leroy Hulsey, AE911Truth)Published on Youtube on September 8, 2019:Online here: https://www.youtube.com/watch?v=jVE3YwRgU9kHere is the translated article:https://mail.cloudaccess.net/Main/frmMessage.aspx?mode=preview&folder=Inbox&messageid=91&mapped=False&user=publiccomment&fromSearch=False&rowNumber=3#

Translation of the blog article „Alle paar Jahre grüßt das 11.-September-Murmeltier“ by German nuclear physicist Dr. Holm Gero Hümmler, dating from September 19, 2019

The beginning of the collapse of WTC7 showed a kink in the roofline (and the north side of the building) visible from below. The kink seems to be a rather characteristic feature of the building's collapse, as it can be understood heuristically by the failure of the interior columns while the exterior columns are still stable for a moment. Therefore the exterior columns are pulled to the inside by the suddenly appearing additional weight of the building's core. However, this kink is not recognizable in the UAF global collapse simulation, although in the simulation the interior columns are removed 1.3 seconds prior to the exterior columns. Please, comment on this obvious discrepancy. In particular:-Under which circumstances would the computer model develop the missing kink?-Is it an error in the computer model —i.e. are some parameters more stable in the simulation than in reality? —or is an additional input of destruction necessary to obtain such a result?

Comments on the Draft Report „A Structural Reevaluation of the Collapse of World Trade Center 7“ (JL Hulsey et al, September 2019)

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All three Key Objectives are not met

According to the Abstract, page i, and repeated verbatim in Section 1.2, page 13,

> „The objective of the study was threefold: (1) Examine the structural response of WTC 7 to fire loads that may have occurred on September 11, 2001; (2) Rule out scenarios that could not have caused the observed collapse; and (3) Identify types of failures and their locations that may have caused the total collapse to occur as observed."

We find that the study fails to fulfill any of its three key objectives.

In short:

(1) Hulsey et al failed to model most of the fires / heating, and all of the fire histories, and thus cannot possibly have accounted for all structural responses

(2) Hulsey et al could not have, and did not, account for all possible or plausible collapse initiating events. Instead, they looked at only three that have been proposed by three previous studies. Because of the incompleteness of Hulsey et al's models, Hulsey were not in a position to fully appraise these three hypotheses.

(3) Hulsey et al do not actually propose any „types of failures" (as in „failure mode"). Their animations only mimic the observed collapse of 9/11/2001 in a very limited number of features, but fail to replicate many other features. Hulsey et al do not explain why these few features are even significant. The few features they do mimic arise not as a result (output) of any theory, any comprehensive and falsifiable hypothesis as to the material cause of the collapse. Rather, they are explicitly input to the animations: All columns are simply, without explanation, conjured away at opportune times. This is non-explanatory.

In detail:

Objective (1): Structural response to fire loads

JL Hulsey and his team chose to limit their analysis of „*fire loads that may have occurred on September 11, 2001*", and of „*the structural response of WTC 7 to [those] fire loads*" as follows:

Fire load and structural response were considered on 2 floors only

Page 23: „*We then used both ABAQUS and SAP2000 to evaluate the fire damage to the floor framing at Floors 12 and 13*". Page 40: „*After the entire WTC 7 was modeled in SAP2000, boundary conditions for Floors 12 and 13 assembly were modeled*". Page 42: „*The loading condition for the Floor 12 and 13 assembly was calculated by imposing axial forces acting on the top of Floor 13*". Page 44: „*After modeling the boundary conditions for Floors 12 and 13, we modeled the concrete slab of Floors 12 and 13*". Page 48: „*Using wire (beam) elements, Floors 12 and 13 were simulated using a finite element model in ABAQUS (see Figure 2.30 below)*". Page 62: „*The WTC 7 fire loading analysis was based on NIST's fire modeling for Floors 12 and 13*". Page 63: „*Note that the models in this analysis consist only of Floors 12 and 13*".

Thus, the JL Hulsey team chose to ignore the very substantial fires on other floors, particularly floors 7, 8, 9 and 11 – which created (in the „worst" Case B) >1,000 °C of gas temperatures in all

those floors[1], slab temperatures >675 °C on floor 7[2] and steel temperatures >600 °C on floor 8[3]. As a result, NIST had found numerous connection failures after 4 h in the framings of all floors 8 to 144. Failing to model the elevated heat profiles in floors 7, 8, 9, 10, 11 and 14 made sure from the outset that the JL Hulsey study could not possibly evaluate the full structural response to all the fires on those floors.

Failure to model fire effects over time

The JL Hulsey team considered the temperature distribution at only one point in time („5:00 pm“ according to the NIST timeline for structural heating). This ensures that possible effects of the dynamics of increasing *and decreasing* temperatures could not possibly have been detected by the JL Hulsey team. This is significant as the Arup team hypothesized that a critical girder connection occurred as cooling, contracting beams pulled a girder off its seat at column 79. JL Hulsey‘s modeling would be blind to such an occurrence.

Failing to model the dynamics of extended multi-floor fires ensured that the JL Hulsey study could not possibly evaluate the full structural response to all the fires on those floors.

It is unclear how NIST‘s temperature distribution was translated by the JL Hulsey team

Page 63: „*We inputted the temperature distribution given by NIST into SAP2000 using three different zones of temperature distribution: high temperature at 1211°F, medium temperature at 941°F, and low temperature, which was room temperature, at 68°F*“.

These three values correspond to 655, 505 and 20 °C, respectively. NIST‘s temperature distribution, as per the color coding in Figure 2.53, is more finely grained in intervals of ca. 20 °C (although sometimes the color gradients are difficult to perceive; for example, light blues between ca. 150 °C and ca. 250 °C are almost impossible to discern). Why were those three values chosen, and how were NIST temperatures above and below those values translated into SAP2000 input values?

It is not obviously clear that this simplification of the temperature distributions is valid – an argument ought to be presented for the validity.

Objective (2): Ruling out scenarios

Hulsey brings up only three „*scenarios that could not have caused the observed collapse*“ (NIST, Arup, Weidlinger), and primarily focuses on only a detail in only one of them (the NIST hypothesis of the girder A2001 walk-off at column 79, floor 13).

General objections

First, it must be pointed out that these three scenarios do not exhaust the entire envelop of possibilities. For this reason alone, the JL Hulsey team cannot possibly have „*[r]uled out*“ *all* scenarios as „*could not have caused the observed collapse*“.

1 NIST NCSTAR 1-9, Figures 9–9 (floor 7), 9–10 (floor 8) and 9–12 (floor 12); the fire simulations for floors 9 and 11 were „copied“and time-shifted from the simulations of fires on floors 8 and 12, respectively.
2 NIST NCSTAR 1-9, Figure 10–26
3 NIST NCSTAR 1-9, Figure 10–29

All three scenarios agree that structural damage was widespread and occurring on multiple (>2) floors in the lower east part of the building – something that the JL Hulsey team did not even consider. The three cited studies disagree, essentially, on which proverbial straw broke the camel‘s back. This implies that at least two of the three scenarios are „wrong“ in the limited sense that they disagree with reality on the specific connection failure which started the transition from gradual destruction to rapid, progressive collapse. They could even all be wrong in the same limited sense – and that would in no way rule out the global conclusion that accumulating fire damage caused the total collapse as observed[4].

But in addition to this failure of top-level logic, the JL Hulsey team also failed to rule out any of the three specific scenarios:

1. Scenario: NIST

As documented previously, JL Hulsey and team failed to model fires and damage accumulation on most of the fire-affected floors, and failed to model the time-histories of the fires and the structural heating they caused. It is unclear, and unlikely, that a single snap-shot taken at an essentially arbitrary point in time, and covering only 2 floors, is sufficient to capture the complexities of the damage patterns that many hours of raging multi-story fires can accumulate in a structure like this.

Also, while NIST‘s own summary narrative somewhat singles out the A2001 girder walk-off on floor 13 as the initiating event[5], their actual LS-DYNA analysis does not[6], and instead stresses the presence of multiple failures on multiple floors as contributing to the buckling of column 79, particularly local collapses on floor 14 – which the JL Hulsey team did not consider.

2. Scenario: Arup

JL Hulsey et al misconstrue the initiating event as hypothesized by Arup as follows (page 86):

> „The Arup report concluded that the girder (A2001) that NIST reported was pushed off its seat by thermally expanding beams to the east of the girder was actually pulled off its seat by the sagging of beams to the east of the girder.“

In reality, Arup proposed two distinct „Initiating Failures“[7]:

> „[…] the triggering event is either the unseating of Girder 44-79 at its connection to Column 79 at Floor 13 (Scenario A) or at Floor 10 (Scenario B). A failure on Floor 13 corresponds to a failure during the cooling phase of the fire and a failure on Floor 10 corresponds to a failure during the heating phase“

---

4 Keeping in mind the perils of analogies, here is one: Suppose you observe an avalanche of rocks going down across a mountain trail, and a man collapsing amidstit. You later find him dead. Three investigators find three different rocks that they claim delivered the fatal strike. Now, even if all three identify the wrong rock, that does not mean the man’s death wasn’t caused accidentally by the rock avalanche! It does not make a proposition more likely that he was instead murdered with a shotgun.

5 NIST NCSTAR 1A, page 22: “Fire-induced thermal expansion of the floor system surrounding Column 79 led to the collapse of Floor 13, which triggered a cascade of floor failures.”

6 NIST NCSTAR 1-9, page 572: “[…] floor sections surrounding Columns 79 to 81 on Floors 13 and 14 collapsed to the floors below, as shown in Figure 12–42. The LS-DYNA analysis calculated the dynamic response of the structure to the floor failures and resulting debris impact loads on the surrounding structure. The thermally weakened floors below Floors 13 and 14 could not withstand the impact from the collapsing floors, resulting in sequential floor collapses.”

7 United States Court of Appeals for the Second Circuit, Case 11-4403, Document 79-1, 02/14/2012, 525397, page JA-3971

Hulsey et al only considered Scenario A – and could not have considered Scenario B, as they failed to model floor 10.

The second error in the Draft‘s paraphrasing of the Arup hypothesis is the claim that „*the girder was actually pulled off its seat by the sagging of beams to the east of the girder*“. The remark by Arup that „*failure on Floor 13 corresponds to a failure during the cooling phase of the fire*“ suggests that not sagging, but thermal contraction, was the cause of this initiating failure. JL Hulsey et al could not have considered this, as they failed to model heating dynamics, including cooling cycles.

Hulsey et al go on to claim (page 86) that „*[t]he Nordenson report instead put forth the idea that these girder connections failed due to stress raisers (cracking) caused by repeated heating and cooling cycles*“. This seems to contradict what they wrote earlier („*pulled off its seat by the sagging of beams*“). Where does the Nordenson report put forth the idea of repeated heating and cooling cycles? Citation, please!

Uncredited work used: Hulsey et al then focus for three pages (p. 86 to 89) on a detail of the Arup report – the notion that the falling 13th floor bay would hit the floor below with such force that it, too, would fail. While this discussion convincingly argues that Nordenson‘s calculation is missing a significant term, the entire argument, including Figure 3.15 and the numbers and calculations, appear to be the work of an uncredited author, who happens to also be a representative of the study‘s sponsor (AE911Truth): Anthony Szamboti. This work was first shown in January 2016 at the internet forum „Metabunk“[8]. The finding that several pages of the Hulsey report have essentially been written by a representative of AE911Truth almost 4 years ago of course immediately raises concerns what other portions of the draft might be the work not of Hulsey but of his sponsor.

The calculation, that seems to disprove that a floor collapse would propagate, of course was done under the assumption that the remaining structure is pristine – that the geometry is not significantly distorted, that no other of the connections involved are damaged or weakened, etc. An assumption, which is questionable after many hours of devastating fires. This has not been assessed by Hulsey et al (Nordenson didn‘t need to for his purposes).

3. Scenario: Weidlinger

As Hulsey et al put it, the Weidlinger reports posits

> „that Floors 9 and 10 were simultaneously heated to between 750° and 800°C in the exact same area of each floor. This extreme heating eventually caused Floor 10 to give way and break through Floor 9, which was possible only because of the extreme heating of Floor 9.“[9]

8 The FEA graphic, with the exact same value for Mode 2 frequency (“+5.1693E-01”) that Hulsey used in his calculation (“0.51693 hz”), is attached to this post: https://www.metabunk.org/does-the-exclusion-of-stiffness-from-nordensons-falling-girder-calculations-demonstrate-anything.t7185/page-5#post-174345 . Szamboti’s calculation was done a little earlier: https://www.metabunk.org/posts/174332/

9 This misconstrues the values in the Weidlinger report (Najib N. Abboud: WTC 7 Collapse Analysis and Assessment Report (October 15, 2010);
Downloadable from http://www.thorntontomasetti.com/projects/world_trade_center_7_collapse_investigation/):
First, according to Najib Figure 81, the relevant beams in the 9th floor east of column 80 were nowhere hotter than about 600 °C.
Secondly, Najib writes explicitly on page B-85: „*failure initiates […] after 4.5 hours of continual heating where the secondary beam in question has achieved average temperatures of 420°C, 720°C, and 750°C in the top flange, web, and bottom flange, respectively. The temperature of the finplate connection is 680°C*“. Also, Figure 81 nowhere shows any relevant bit of steel above 794 °C. It is unclear why Hulsey et al claim that two floors (!) were

Since Hulsey et al did not consider fires, heat and damage on floors 9 and 10, their modeling work cannot possibly address the Weidlinger findings. Instead, without reference or work, Hulsey et al merely brush aside the hypothesis (page 90) – I quote *in full* their discussion of the Weidlinger report:

> „However, the details of the thermal analysis by Dr. Beyler are not shown in the Weidlinger report, and Beyler's analysis has not been made public, despite its central importance to Weidlinger's hypothesis. It is important to understand that steel structural members reaching temperatures of 750°C due to office fires can be considered extraordinary. Without any analysis provided to substantiate such temperatures, Weidlinger's collapse initiation hypothesis must be viewed skeptically and can only be assumed to have a very low probability of occurrence."

Hulsey et al imply that Weidlinger have done no analysis – when clearly they have. It is, in fact, Hulsey et al who have not done any analysis here. It is unclear why they call these temperatures „extreme". Have Hulsey et al reached out to Dr. Beyler and asked for the thermal analysis?

In short, **Hulsey et al simply did not analyze the Weidlinger scenario** and thus cannot rule it out as having caused a progressive collapse and the buckling of columns 79 to 81.

Objective (3): Identify types of failures and their locations that may have caused the total collapse to occur as observed

General objections

What does „types of failures" mean, really?

The three earlier studies that Hulsey et al cite all identify specific failure modes (buckling, shearing, tearing, sagging, expanding, walking off, …) with specific causes, which go back to a plausible initial state: The building as built, with realistic fuel load, and fire ignited somewhere at some time. There is an unbroken chain of causes and effects from initial state to total collapse. That is what one would expect from any forensic engineering report – including Hulsey's.

But it's not what this draft delivers: Chapter 4 entirely ignores the fires and the damage they accumulated, and then conjures up, without explanation, the sudden total removal of columns, to force the structure above them move down.

There is no explanation to what may have caused this sudden removal of columns. As a matter of fact, JL Hulsey was asked at his September 03 presentation in Fairbanks[10]: „*You said that the fire did not cause the collapse. Do you any hypotheses of what DID cause the collapse?*", and his answer was, ominously, and to a round of laughs: „*I'm not going there*."

So at this point, the objective has failed – on purpose: JL Hulsey is not going there – is not going to identify the „*types of failures*".

But the entire effort to „identify types of failures and their locations" fails on more counts:

- Hulsey et al attempted to mimic only a few arbitrarily selected features, which NIST also managed to mimic

(the entire relevant areas?) „simultaneously heated to between 750° and 800°C". They were not.

10 https://www.youtube.com/watch?v=TAEHhDCTaBw&t=1h8m35s

- They did so not as a result of theory but as a forced, straightforward input
- They failed to mimic many other observed features, or at least did not check whether they were mimicked.

In detail:

„Three key features“ - forced into animation as input, not result of any hypothesis

Chapter 4 is the place that purports to address the third objective. The goal here appears to be to generate a collapse simulation that „*closely resemble[s] the observed collapse*“ (page 91). To this end, Hulsey et al identify

> „three key features that occurred during the collapse of WTC 7, which we then attempted to replicate in our simulations of the collapse. These three key features are as follows:
>
> 1. The collapse of the east penthouse, which begins approximately 6.9 seconds prior to the descent of the north face roof-line
>
> 2. The collapse of the screenwall and west penthouse, which begins approximately 0.5 to 1 second prior to the descent of the north face roof-line; and
>
> 3. The descent of the north face roof-line, which progresses at a rate of free fall for approximately 2.25 to 2.5 seconds over a distance of approximately 105 feet or 8 stories, during which the building’s sheathing remains attached to the exterior steel framing and does not experience visible differential movements.“

Hulsey et al correctly point out that „*NIST’s progressive collapse simulation does show the three key features listed above*“. But it bears pointing out that, in the NIST simulation, these features all arise as a result (output) of the chain of analysis they did, from fire models to structural heating to damage accumulation from fires to onset of rapid collapse all the way through a global collapse model: NIST actually **explains** the observed collapse features as ultimately **caused** by the fires they modeled in the first step.

Hulsey et al on the other hand

1. **forced** the „collapse of the east penthouse […] approximately 6.9 seconds prior to the descent of the north face roof-line“ by making the columns underneath the east penthouse disappear, without cause and explanation, 7 seconds prior to making the columns low across the entire perimeter disappear, without cause and explanation,
2. **forced** the „collapse of the screenwall and west penthouse […] approximately 0.5 to 1 second prior to the descent of the north face roof-line“ by making the columns underneath the west penthouse disappear, without cause and explanation, about a second6 prior to making the columns low across the entire perimeter disappear, without cause and explanation and
3. **forced** the „descent of the north face roof-line […] at a rate of free fall […] over a distance of […] 8 stories“ by making the columns low across the entire perimeter disappear over a distance of 8 stories, without cause and explanation

In other words, all three features arise not as a result (output) of any model that represents a theory, but as a **forced input** to an animation. **This is entirely non-explanatory**.

„We could not find“ ≠ „Does not exist“

On page 2:

> „no other sequence of failures that we simulated produced the observed behavior. We cannot completely rule out the possibility that an alternative scenario may have caused the observed collapse; however, the near-simultaneous failure of every column is the only scenario we identified that was capable of producing the observed behavior.“

Exactly. You cannot completely rule out the possibility that an alternative scenario may have caused the observed collapse. So don‘t rule it out, and retract the „*secondary conclusion of our study is that the collapse of WTC 7 was a global failure involving the near-simultaneous failure of every column in the building*.“ It‘s logically invalid.

Failure to recreate other features

No attempt is made to justify why these three features, and not any of the many others that one could pick out, were selected as the target for simulation. Here is an incomplete list of further features, which were in fact observed, but not chosen by Hulsey et al as „*key features*“, and which also do not appear to have arisen as a result of their simulation:

1. The development of the kink in the north wall
2. Daylight visible through windows in the upper eastern corned of the north wall, seconds after the east penthouse began to collapse
3. The east-to-west onset of drop of of the screen wall and west penthouse
4. The building‘s exterior twists or turns counter-clockwise (north-east corner falls towards north, the western corners fall towards south)
5. Part of the west wall impacted the face of the Verizon building
6. Part of the north wall impacted Fiterman Hall

NIST misconstrued

Modeling of the exterior steel framing

Hulsey et al claim on page 2:

> „During our nonlinear connection study (Section 2.1.3.2), we discovered that NIST overestimated the rigidity of the outside frame by not modeling its connections, essentially treating the exterior steel framing as thermally fixed, which caused all thermally-induced floor expansion to move away from the exterior. The exterior steel framing was actually flexible, while the stiffest area resistant to thermal movements, i.e., the point of zero thermal movement, was near the elevator shafts.“

It is unclear why Hulsey et al claim here that NIST did not model the outside frame connections. In Section 2.1.3.2 (page 28), they describe it correctly:

> „In the NIST investigation, the failure of the floor-framing connections and the shear studs was modeled with break elements on Floors 8 to 14. Outside the selected area in Figure 2.4 shown below, structural damage — such as buckling of the steel frame and crushing and cracking of the concrete slab — was modeled over the entire floor, but connection failures were not modeled over the entire floor.“

Correct: NIST did not model connection **failures** outside a defined are. Notice: Connection *failures* are a thing quite different from *connections*. One can model connections as stiff or flexible, but without a break element; or with a break element. NIST described where they included break elements, and where they did not. The next sentence then (page 29) is wrong:

> „Connections were also not modeled in the exterior moment frame, as no failures were observed there prior to the onset of global collapse (NIST, 2008, NCSTAR 1A).“

First of all, the reference is wrong: NCSTAR 1A does not go into any detail about which connections have break elements and which don‘t. You find this actually in NCSTAR 1-9, page 475f (Section 11.2.5 Modeling Connections). Here is NIST‘s actual wording:

> „The floor area where failure of floor framing connections and shear studs was modeled with break elements on Floors 8 to 14 is shown in Figure 11–9. This area is east of the north-south line passing through Column 76 and the core area east of Column 73.
>
> Outside the selected area, structural damage–such as buckling of the steel frame and crushing and cracking of the concrete slab–was modeled over the entire floor, but connection failures were not modeled. The extent of the area with detailed connection models was based on the results of single floor fire simulations, where connection damage west of Columns 73 through 76 were not found to contribute to an initial failure event on the east side of the structure. The area where break elements were modeled was selected to reduce the model size without biasing the results for simulating the initial failure event.
>
> Framing connections outside of the selected area, or on other floors not subjected to fire, were modeled as either fixed or pinned, using typical modeling approaches. Connections were not modeled in the exterior moment frame, as no failures were observed there prior to the onset of global collapse. Column splices were also not modeled for interior columns, as the purpose of the ANSYS model was to accumulate local failures up to the point of buckling in a column. When column buckling appeared to be imminent, the analyses were continued in the LS-DYNA 47 story model.“

Read in context, it seems likely that there is a slight error in this text: „*Connections were not modeled in the exterior moment frame, as no failures were observed there prior to the onset of global collapse.*“ This should probably read „Connection **failures** were not modeled in the exterior frame …“, for the sentence goes on to talk about the absence of failures. An inquiry with NIST could have cleared this up.

Hulsey et al misunderstand how NIST modeled connections in their next paragraph (page 29):

> „First, by not modeling connections in the outside frame, NIST overestimated the rigidity of the outside frame. That assumption and inconsistent modeling for the framing connections resulted in the stiffness of the east side of the building being different than that of the west side. This resulted in the stiffness being compromised across the plan of the building.“

The first sentence *might* be correct *if* I am wrong about NIST mistyping. However, the rest of the paragraph is mostly wrong: NIST did not model connections in the west fundamentally different, or just stiffer, than in the east: The only significant difference is that the connections in the east had break elements, meaning that they could possibly fail (and thus lose their stiffness). It was determined in a preliminary „*single floor fire simulations, [that] connection damage west of Columns 73 through 76 [would not] contribute to an initial failure event on the east side of the structure*“. It‘s a matter of engineering judgment whether or not it‘s significant if some connections at a distance from columns 79 to 81 had failed or not.

Conflating ANSYS and LS-DYNA models

In the next paragraph (page 29), Hulsey go too far in conflating the ANSYS (NCSTAR 1-9 Chapter 11) and LS-DYNA (NCSTAR 1-9 Chapter 12) models:

> „The NIST simulation of the collapse illustrated that the west side of the building acted differently from the east side. The structural response to failure would more closely resemble the actual collapse if the connections had been accounted for throughout the structural frame. By not modeling the connection failures outside the selected area shown in Figure 2.4 above, NIST appears to have reduced the stiffness in the area outside the selected area and separated its progressive collapse simulation into two parts (see Figure 2.5).“

Figure 2.5 juxtaposes two different models:

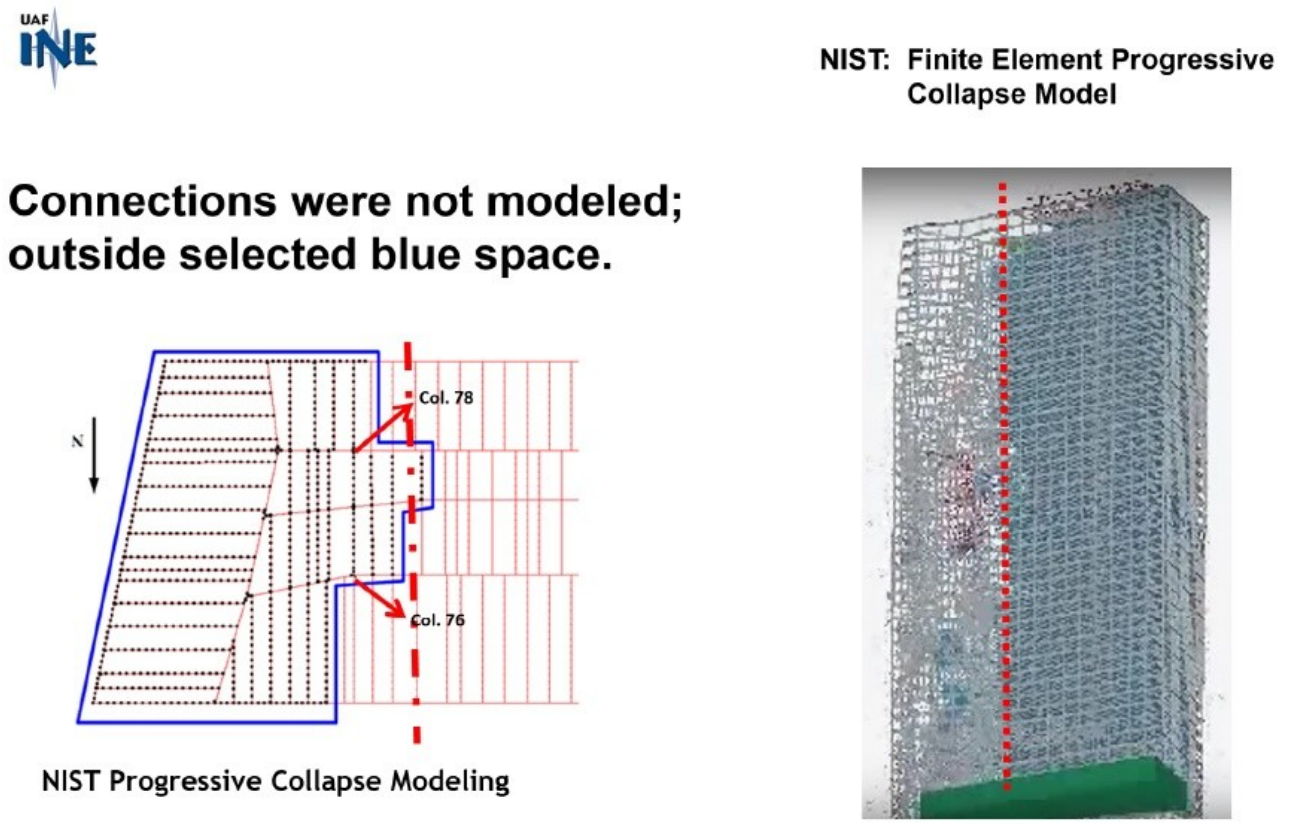

Figure 2.5 Progressive collapse separated into two parts.

The floor connections east and west are modeled differently only in the ANSYS model (left), not in the LS-DYNA model (right)! It seems reasonable that, in the right image, the east art looks less

stable because it is *already* collapsing! NIST concentrated on the east part of the building, and modeled it somewhat more sophisticatedly, because the real WTC7 was observed to collapse in its east part first. So the causation is that the ANSYS model has the blue area because that‘s what collapsed first (became unstable; lost stiffness) first, and not: The LS-DYNA model looks unstable in the east because of the blue area.

In addition: It may be true that some connections west of columns 76-78 would have been detected as failed had the ANSYS model included break elements there, and these failed connections would have been transferred to the LS-DYNA model as starting conditions, making the west core somewhat less stiff. However (NCSTAR 1-9 page 539, my emphasis):

> „The global LS-DYNA model had the following input data:
>
> • Extent of initial damage to the building due to debris impact from the collapse of WTC 1 (Chapter 5).
>
> • Mechanical properties of steel (Appendix E and NIST NCSTAR 1-3D) and concrete (NCSTAR NIST 1-6A) used in the construction of WTC 7.
>
> • **Temperature-dependent mechanical properties of steel** (Appendix E and NIST NCSTAR 1-3D).
>
> • **Temperatures of structural components and connections**, at the time when the ANSYS results were transferred to the LS-DYNA analysis (Chapter 10).
>
> • Fire-induced damage to floor beams, girders, and their connections from the 16 story ANSYS analysis (Chapter 11).“

and it was then run with the following loading sequence (page 563):

> „• First, gravity was applied slowly to the 47 floor structure over 4.5 s of elapsed simulation time to damp residual vibrations and eliminate dynamic response. The loads were applied smoothly with a sinusoidal load curve.
>
> • Then, the debris impact damage from the collapse of WTC 1 was applied to the structure instantaneously by removing damaged elements from the model that were no longer capable of bearing their loads. The structure was then allowed to damp residual vibrations for 2 s.
>
> • Next, **the structural temperatures were applied** smoothly with a sinusoidal curve and allowed to damp residual vibrations for 2 s.
>
> • Last, the fire-induced damage obtained from the 16 story ANSYS analysis, including damage to floor beams, girders, and connections, was applied instantaneously. The heated, damaged structure was then free to react.“

And this is interesting because (page 566):

> „the LS-DYNA model was able to predict damage due to the temperatures for a specific point in time and the subsequent dynamic progression of failures leading to the global collapse of WTC 7.“

So in short: The LS-DYNA model, being fed with the „Case B at 4 h“ structural temperatures throughout the entire floors 7 to 14, was able to model the connection damages that arose from those temperatures at that time and proceed from there. It is not true that this model had to do entirely without fire damage west of the blue area.

Short and assorted remarks

References

Hulsey et al should give more specific references: Quote the works of others wherever possible, instead of paraphrasing; provide page numbers etc.

The References (page 113) should conform to usual standards, to include full authors, correct and full titles, publishers, URLs where applicable, etc.

Excise irrelevant sections

Example: Pages 11 and 12 contain mostly speculation, the relevance of most of it remains unexplained. Why is hot corrosion in the debris pile an „anomaly“? Why is a brief episode of some part of a collapsing structure exhibiting freefall acceleration an „anomaly“? The statement „The debris pile of WTC 7 was contained mostly inside the building’s footprint“ is nearly meaningless: What does „mostly“ mean? Why would a collapsing building not fall „mostly“ into its footprint? Why is that an „anomaly“? Besides, WTC7 surely did not drop into its footprint at all, according to the way demolitions experts use the term (i.e. stay clear of adjacent infrastructure and other buildings): Its debris blocked streets all around and caused major damage to at least two other buildings across two different streets (the Verizon building, which had WTC7 exterior frame steel sticking out of its face; and Fiterman Hall, which was hit, on its roof even, by WTC7 debris so badly it had to be deconstructed eventually).

Example: The unreferenced speculation on page 22 that „*financial centers*“ would not „*have paper lying around*“.

Invalid linear static analysis results

Figures 4.14 and 4.15 show „*Visualization[s] of linear static analysis*“ of the building in states where it clearly has not been static anymore for quite some time – this type of analysis is no longer valid at this point.

Unrealistic dynamic analysis results

Figures 4.16 and 4.20 show „Dynamic analys[e]s results showing the building tipping…“, where it is obvious that the simulation does not apply relevant and necessary physics – the floors are passing through each other without any apparent interaction, no connection failures, no bending of anything. This is clearly unrealistic. Something went very wrong here.

I expect that other submitters will say more on these issues.

Principal conclusion refuted

Hulsey et al, page 1f:

> „**Fire Did Not Cause the Collapse of WTC 7**
>
> The principal conclusion of our study is that fire did not cause the collapse of WTC 7 on 9/11, contrary to the conclusions of NIST and private engineering firms that studied the collapse.
>
> This conclusion is based upon a number of findings from our different analyses. Together, they show that fires could not have caused weakening or displacement of structural members capable of initiating any of the hypothetical local failures alleged to have triggered the total collapse of the building, nor could any local failures, even if they had occurred, have triggered a sequence of failures that would have resulted in the observed total collapse.“

This is based, in essence on two approaches:

1. Proving NIST, Arup and Weidlinger wrong
2. Not finding an initial damage pattern that results in a simulation collapse that closely resembles the observed real collapse

Both approaches are invalid:

1. One can‘t prove a global negative („All possible combinations of fire initiation and building conditions could not have resulted in this collapse“) by disproving only a small subset of the possible scenarios – even assuming Hulsey had done enough to disprove the other studies. Which they have not
2. Not finding a solution does not imply that there exists none – unless one can rigorously prove ti have searched the entire solution space. Which Hulsey et al have not.

As a consequence, the study failed to prove its principal finding.

To:

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OBJECT: Public Comment Period for UAF WTC7 Draft Report - Second comment from Giorgio Corvasce - Air effect - UAF simulation compatible with NIST data set.

In the UAF Draft Report, §4.6, Pag. 106, it is written "Specifically, the simulated velocity and acceleration of the building in our SAP2000 model matches almost exactly with the motion measured by David Chandler (Chandler, 2010), including the approximately 2.5 seconds of free fall, shown in Figures 4.21, 4.22, and 4.23 below."
This is Fig.4.23:

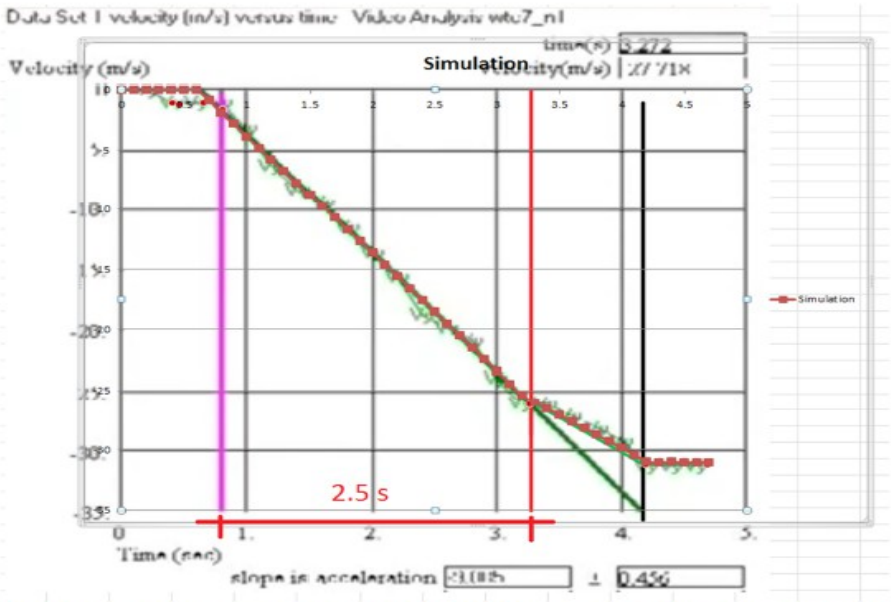
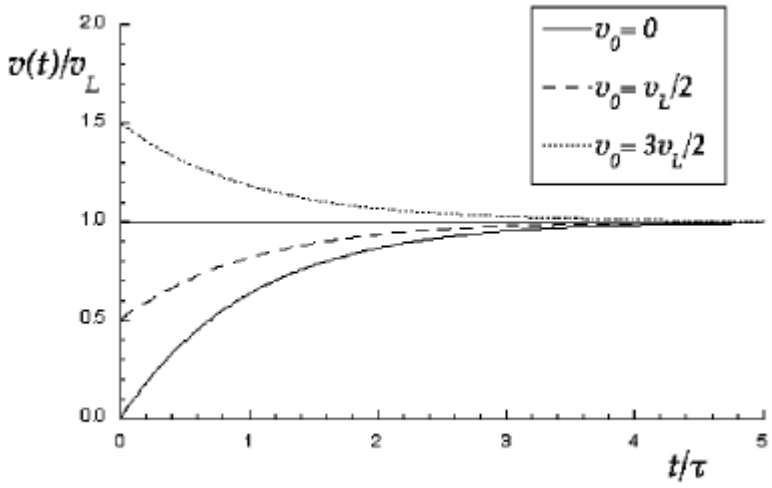


Figure 4.23: Velocity comparison between Chandler measurement (green plotted line) and UAF simulation (red plotted line). Bold green trend line illustrates free fall.

Moreover the UAF report says: "Bold green trend line illustrates free fall".

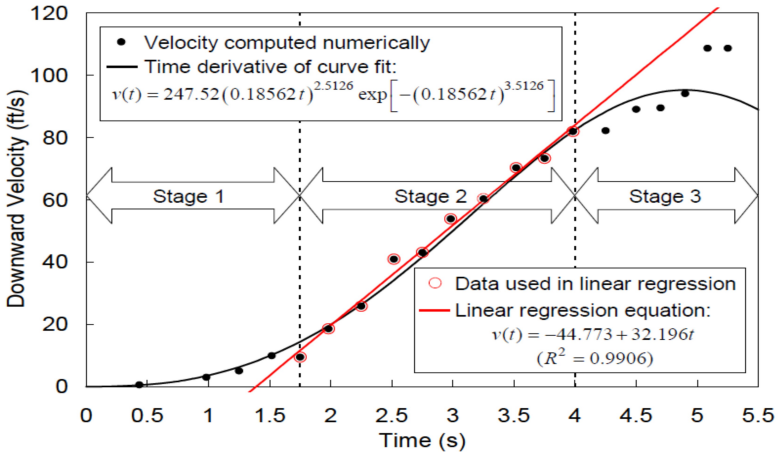
This is not accurate. Bold green trend line illustrates a free fall in the vacuum, so it is not realistic. Falling speed of WTC7 reached a velocity greater than 30m/s. At such speed it is not correct to ignore the presence of air, so velocity vs. time should not be linear.
Free fall in the air must take into account a resistant force depending on the speed and which increases with speed.
As a consequence, in a real free fall, velocity must tend asymptotically to the limit velocity v_L according to the following picture.



It is not easy to develop a model of a building falling in the air. Let's use the same method used by NIST (least square method).
I already sent another comment based on the use of a discontonuous function to interpolate the NIST velocity vs. time data set. Some concepts are the same, sorry for that.

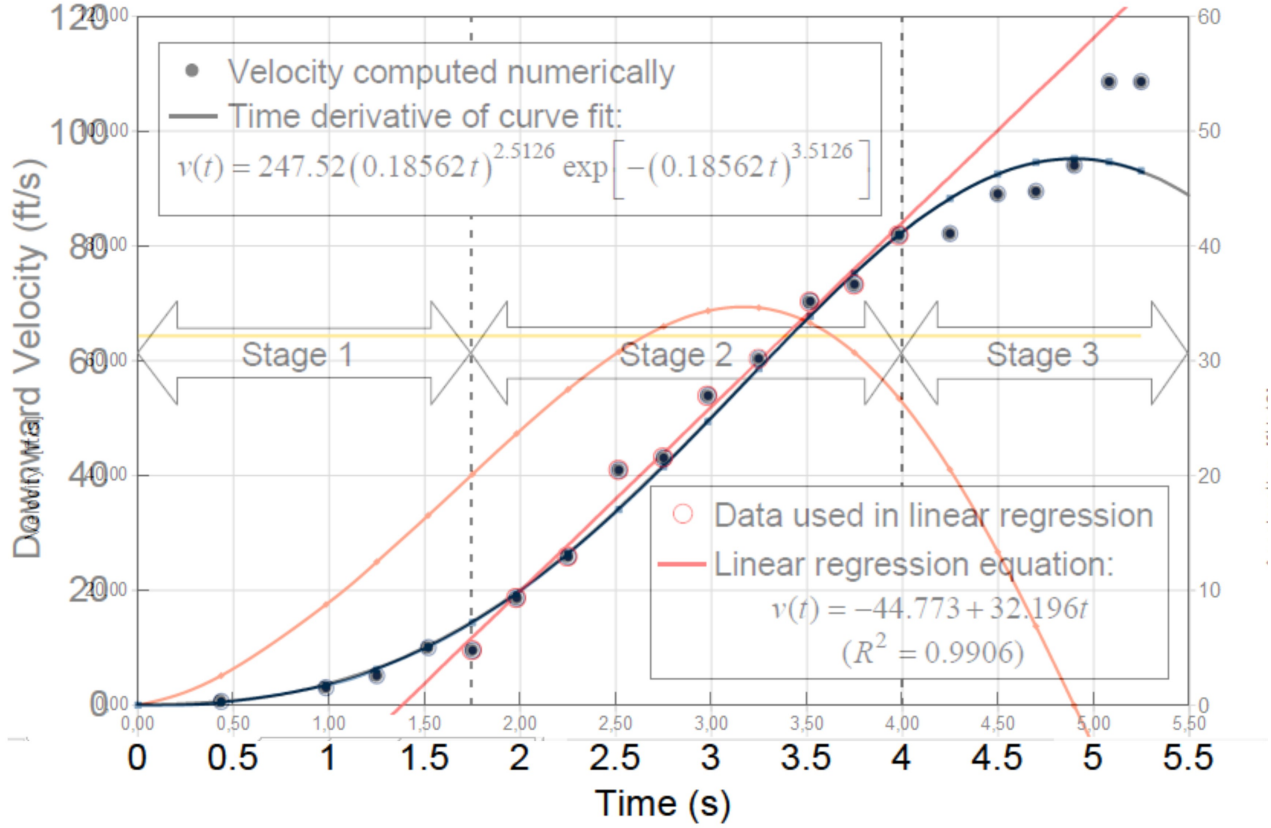
I performed the following five steps:

1) The first step is the extraction of the coordinates of the NIST measurement points from NIST NCSTAR 1A Figure 3-15.



In order to minimize measurement errors it is possible to print pag.46 of the document (pag. 88 of the pdf file) directly as high resolution (600 or 1200 dpi) image file, and than perform the measurement directly with photoshop. See appendix A.

2) The second step is the data set validation. It is perfomed overlapping Fig.3-15 and a graph of the data set obtained during the previous step (See appendix B).



The overlap of the 20 points is extremely good, so the data set is reliable.

3) The third step is the Interpolation. It is necessary to try changing some parameters of a suitable function in order to minimize the Residual Sum of Squares.

I decided to use the following function (portion of sigmoid):

$$\begin{cases} v(t) = 0 \mid t < t_0 \\ v(t) = \left[4al\left(\dfrac{1}{1+e^{-\frac{t-t_1}{l}}} - \dfrac{1}{1+e^{-\frac{t_0-t_1}{l}}}\right)\right] \mid t \geq t_0 \end{cases}$$

It is a 4 parameters function t_0 (start of collapse); t_1 (point of maximum acceleration); a (maximum acceleration); l time constant;
This function satisfy the following conditions:

- $v(t_0) = 0$; Initial velocity is zero; initial displacement is zero.
- it tend asymptotically to a limit, as any object falling in the air tend asymptotically to a "limit velocity";
- it shows a flex point at $t=t_1$, where acceleration is equal to a; We already know that acceleration reached g so we can put directly a = g;

- acceleration is never greater than g, while NIST function is unrealistic because acceleration became >g.
- The forces f(t) applied to the building are discontinuous at $t=t_0$, so the acceleration $a(t) = f(t)/m$ is discontinuous at $t=t_0$.

Acceleration is:

$$\begin{cases} a(t) = 0 \mid t < t_0 \\ a(t) = \dfrac{4ae^{\frac{t-t_1}{l}}}{\left(e^{\frac{t-t_1}{l}}+1\right)^2} \mid t \geq t_0 \end{cases}$$

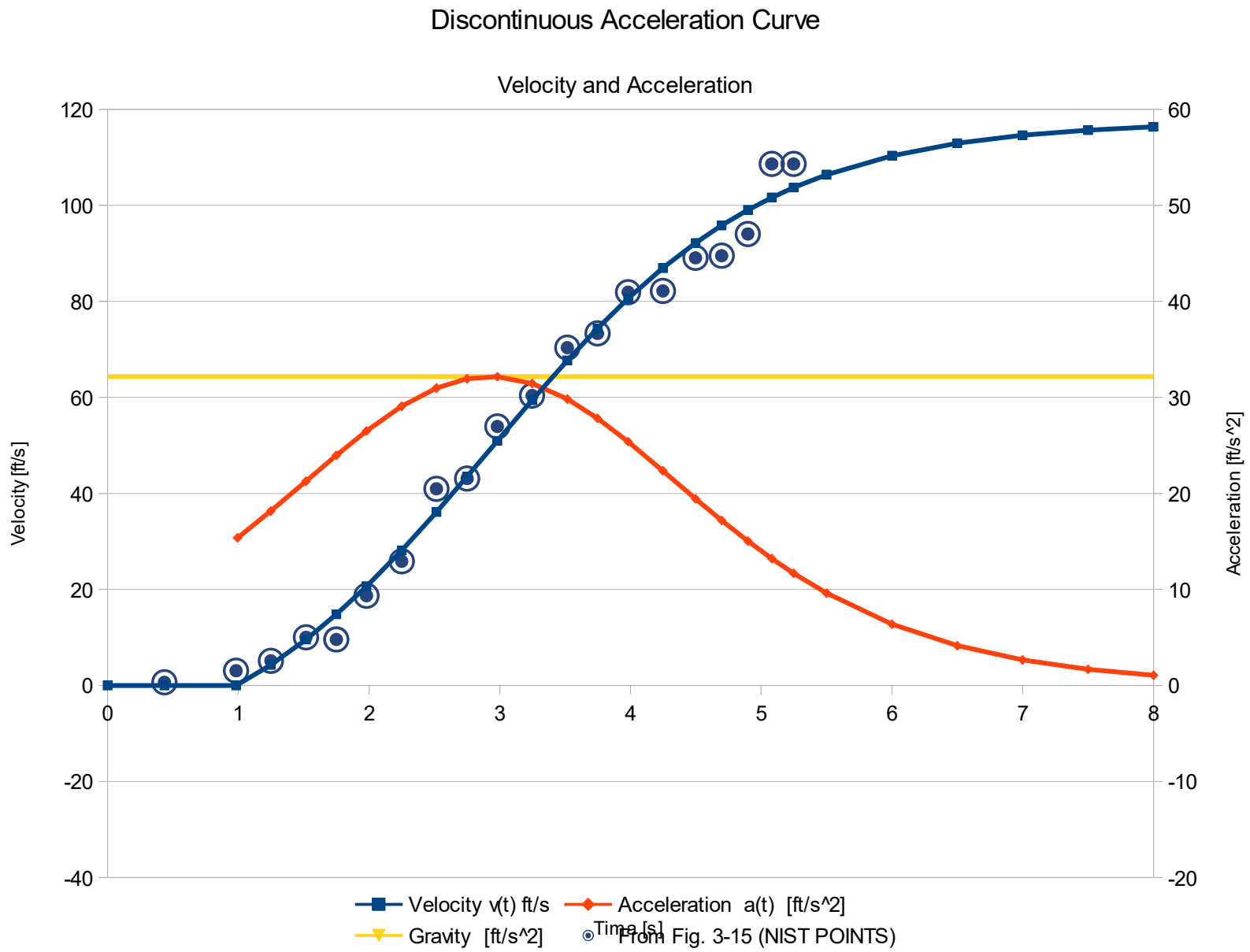
$a(t_0) = v'(t_0) > 0$ discontinuity;
$a(t_1) = v'(t_1) = a$.

4) Fourth step. Minimize Residual Sum of Squares (RSS).
It is necessary to look for some values of the parameters able to minimize RSS. I found the following values:
t_0 (start of collapse) = 0,994;
t_1 (point of maximum acceleration) = 2,930;
l time constant = 1,060 s.

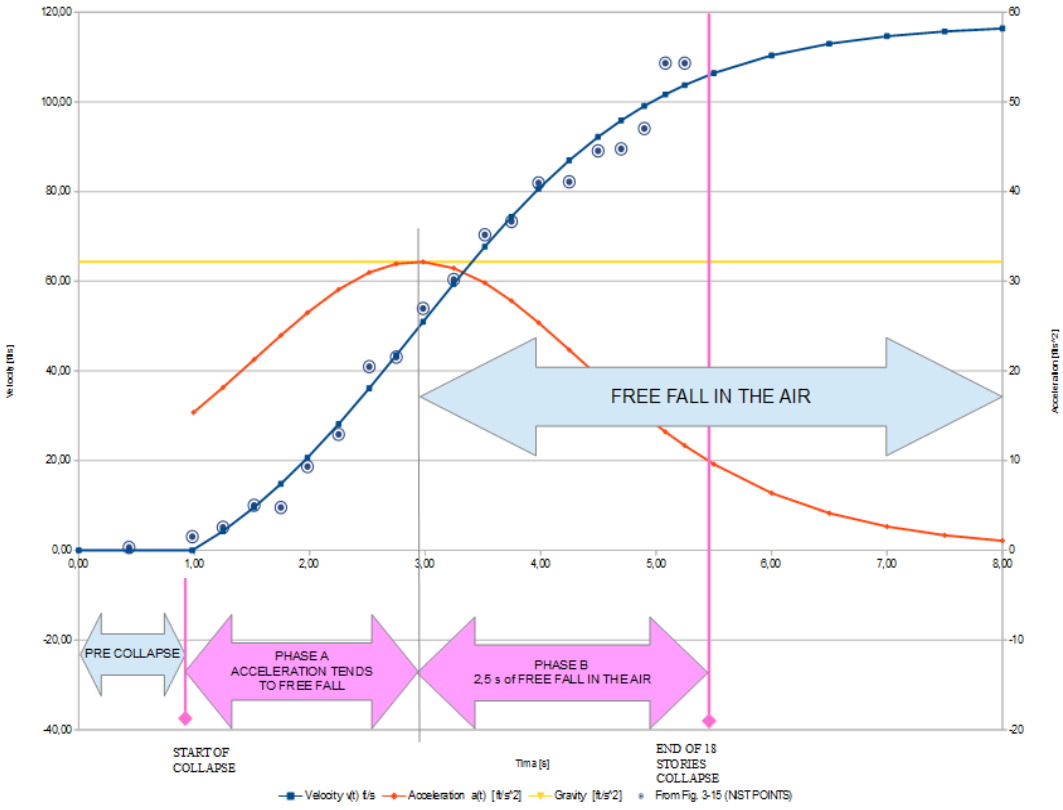
With these values RSS = 261,1 which is 58% better than NIST function (RSS_{NIST}=621,5).
(see attached spreadsheet).
This means that the function is absolutely reliable.

As a consequence of the least square method we can see that “limit velocity” extrapolated by NIST data set is about 117,50 ft/s or 35,81 m/s.
(see attached spreadsheet).

Velocity and acceleration are:



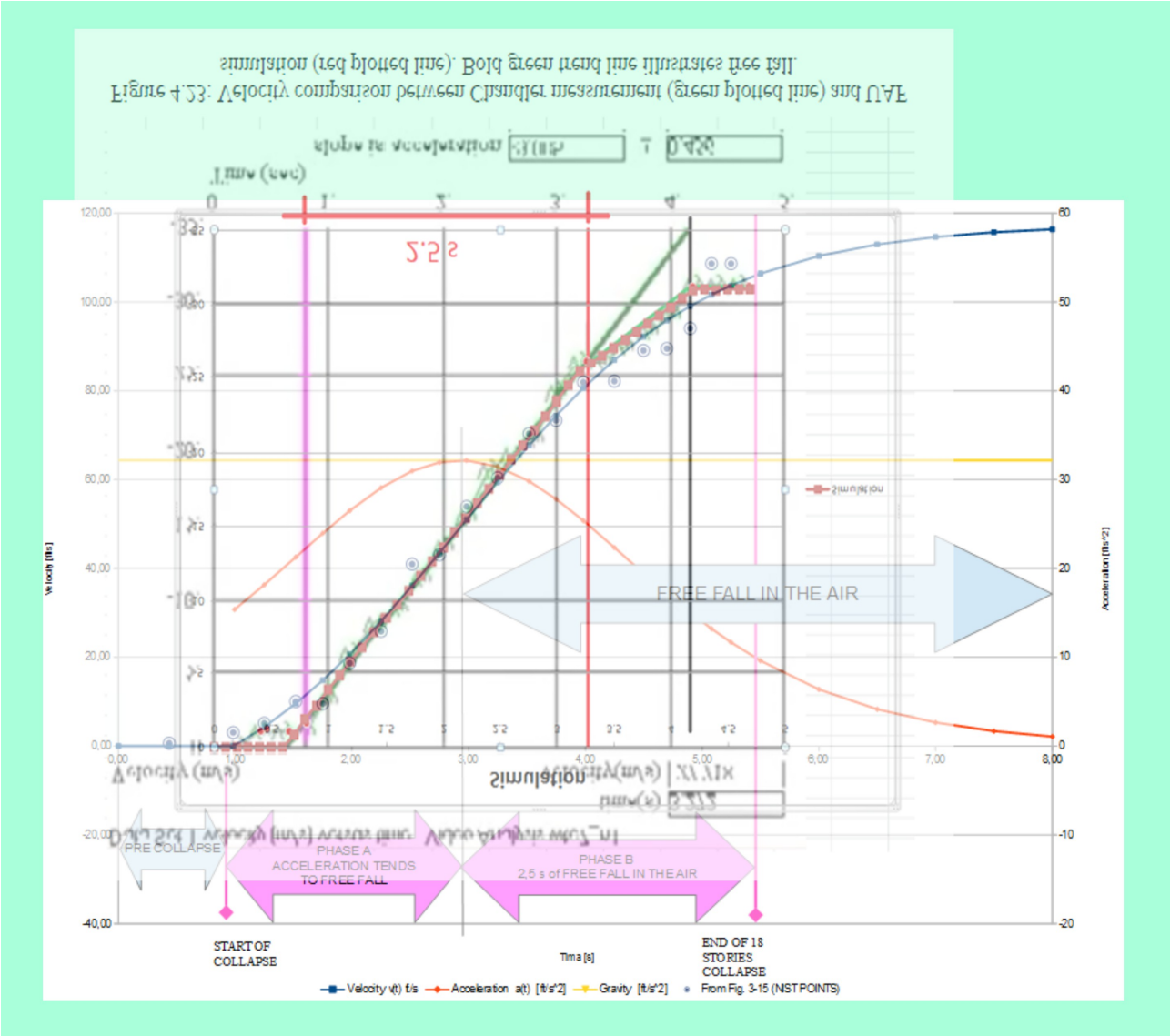
A possible interpretation of the graph is the following:



Phase A: The building collapse. Acceleration tends to free fall. Some residual resistant structures are destroyed by the enormous weight of the building. Few columns that are still melting give way, the partitions crumble, the stairs are shattered. In a couple of seconds acceleration grows till g. Acceleration =g means that there are no (or neglectable) forces opposed to collapse, so the upper part of WTC7 is suspended in the air without any load bearing structure. Effect of air presence is neglectable because the velocity is low.
Phase B: free fall in the air, acceleration is almost g and decreases while the velocity increase.

5) fifth step. Compare intepolation with UAF simulation.

In the following there is an overlap beween presious figure and UAF report Fig.4.23:



As you can see the function which interpolate NIST data set is extremely similar to both UAF simulation and David Chandler measurement.

Conclusions:
It is useless to compare the UAF simulation with a free fall in the vacuum.

In fig.3-15 NIST used a continuous function to interpolate data of a discontinuous phenomenon. In fact RSS is quite high. I demonstrated that a portion of a sigmoid function best fits the NIST data points. This function tend asymptotically to a limit velocity, as in a real free fall. RSS of this function is 58% better than NIST function.

Overlap between UAF simulation, David Chandler measurement and this function, based on NIST data set, shows how all three methods lead to the same outcome:
Collapse started at t about 1;
Collapse time was about 4,4 s;
Acceleration reached g => no any force opposed to the collapse.

Convergence of UAF simulation with NIST measurements, as well as those of David Chandler, confirms the reliability of the UAF study.

End of comment

Appendix A. NIST data set (unofficial).

Measurement from Fig. 3-15		
Point	Time (s)	Velocity (ft/s) yi
A	0,44	0,64
B	0,98	3,05
C	1,25	5,14
D	1,52	10,04
E	1,75	9,56
F	1,98	18,67
G	2,25	25,86
H	2,52	40,96
I	2,75	43,09
L	2,98	53,94
M	3,25	60,39
N	3,52	70,36
O	3,75	73,33
P	3,98	81,93
Q	4,25	82,17
R	4,50	89,08
S	4,70	89,52
T	4,90	94,06
U	5,08	108,63
V	5,25	108,63

Error from Fig 3-15 is
<= +/- 0,01 s Time
<= +/- 0,10 ft/s Velocity

Appendix B. Replica of Fig. 3-15 from NIST

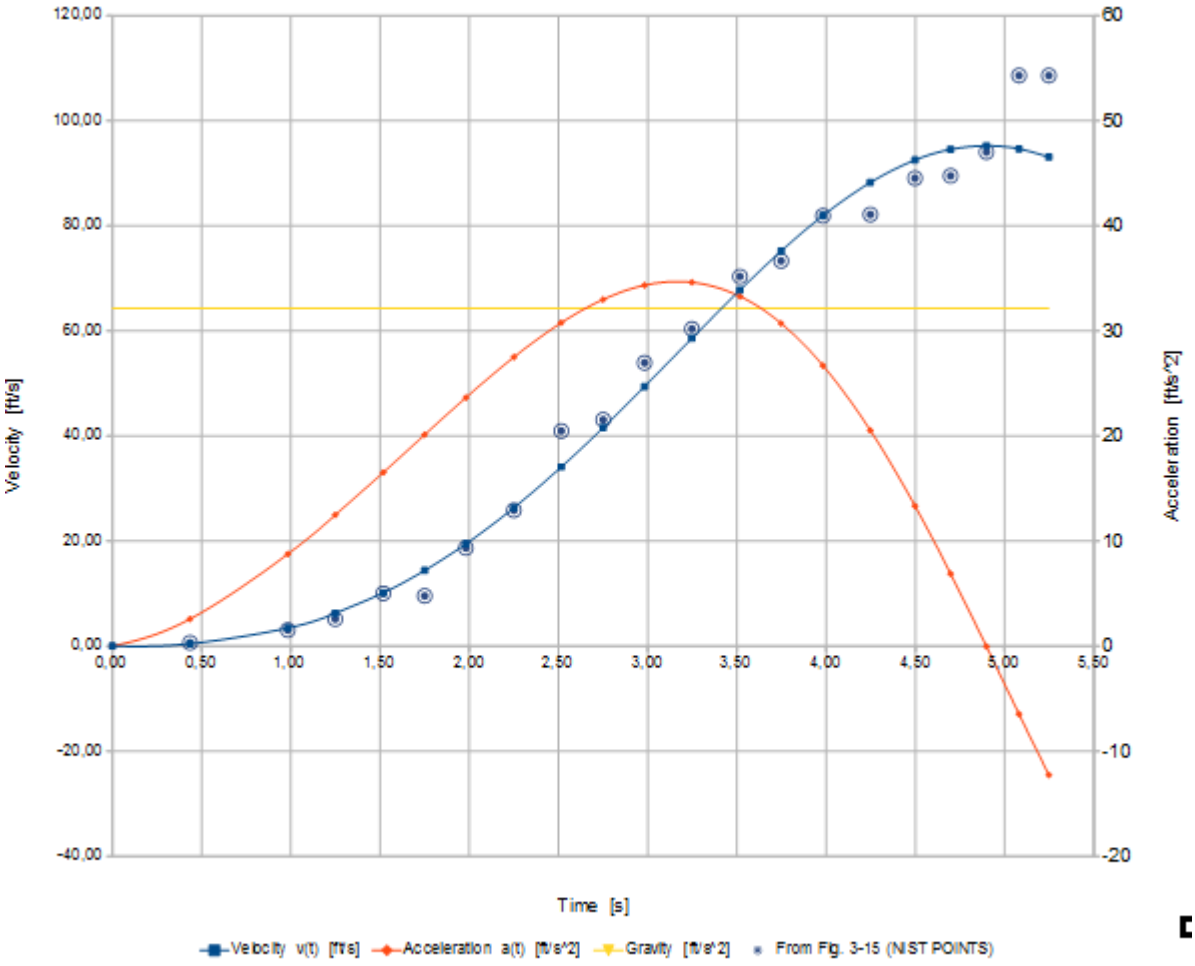


Figure 1 OpenOffice Calc

I'm the Italian electronic engineer. I already sent a comment on 4/11/2019. I would like to provide another comment to the UAF WTC7 Draft Report. You can find as attachments two .pdf and one .png files.

To:

Architects & Engineers for 9/11 Truth
publiccomment@AE911Truth.org

Copy to:

Department of Civil and Environmental Engineering
College of Engineering and Mines
Institute of Northern Engineering
University of Alaska Fairbanks
uaf-cem@alaska.edu

OBJECT: Public Comment Period for UAF WTC7 Draft Report

In the UAF Draft Report there is the explicit reference to the NIST, NCSTAR 1A, Fig. 3-15, (see. Fig. 1.6 pag.12).
Results of UAF study poses severe doubts on the reliability of this NIST velocity model and to the validity of Fig.3-15, and it should be mentioned in the conclusions.
In particular, simultaneous failure of all core columns followed by the simultaneous failure of all exterior columns produces major discontinuities in the forces applied to the building.
NIST calculated that the time that the roofline took to fall 18 stories or 73.8m was approximately 5.4s (see NIST NCSTAR 1A - Final Report on WTC7 collapse - 3.6 timing of collapse initiation and progression). This results has been obtained using a continuous function of the form $z(t)=A\{1-\exp[-(t/\lambda)^k]\}$ which satisfy the initial conditions of zero displacement, zero velocity and zero acceleration (see note 3 on Pag.45). This last assumption (zero acceleration) **is wrong** if all the exterior columns collapsed simultaneously because at t=t0 the downward acceleration could suddenly change from zero (t<t0) to a(t) (t>=t0). Discontinuous functions which satisfy initial condition of zero displacement, zero velocity and unknown downward acceleration must than be used for least square fitting. So the model used by NIST is inadequate.

End of Comment

Demonstration Example

In the following I will provide a comparison between the NIST velocity function and a discontinuous function (portion of sigmoid. Details are provided as attachment).
Using a sigmoid function for the velocity (adequately scaled and shifted), adding a discontinuity in the acceleration at $t=t_0$, and leaving the start of collapse t_0 as an unknown parameter, it is possible to significantly reduce the residual sum of the square. I reached a 58% reduction and this means a much better model of the phenomenon.
I started measuring the data set of the 20 reference points of NIST NCSTAR 1A Final Report Fig. 3-15 (Pag.46) on an high resolution computer image. I got the following values:

Measurement from Fig. 3-15		
Point	Time (s)	Velocity (ft/s) yi
A	0,44	0,64
B	0,98	3,05
C	1,25	5,14
D	1,52	10,04
E	1,75	9,56
F	1,98	18,67
G	2,25	25,86
H	2,52	40,96
I	2,75	43,09
L	2,98	53,94
M	3,25	60,39
N	3,52	70,36
O	3,75	73,33
P	3,98	81,93
Q	4,25	82,17
R	4,50	89,08
S	4,70	89,52
T	4,90	94,06
U	5,08	108,63
V	5,25	108,63

Unofficial data set of NIST points

Than I inserted these data and the NIST velocity function inside a spreadsheet. In the following you can see NIST Fig.3-15, our Figure 1 Openoffice and an overlap between them.

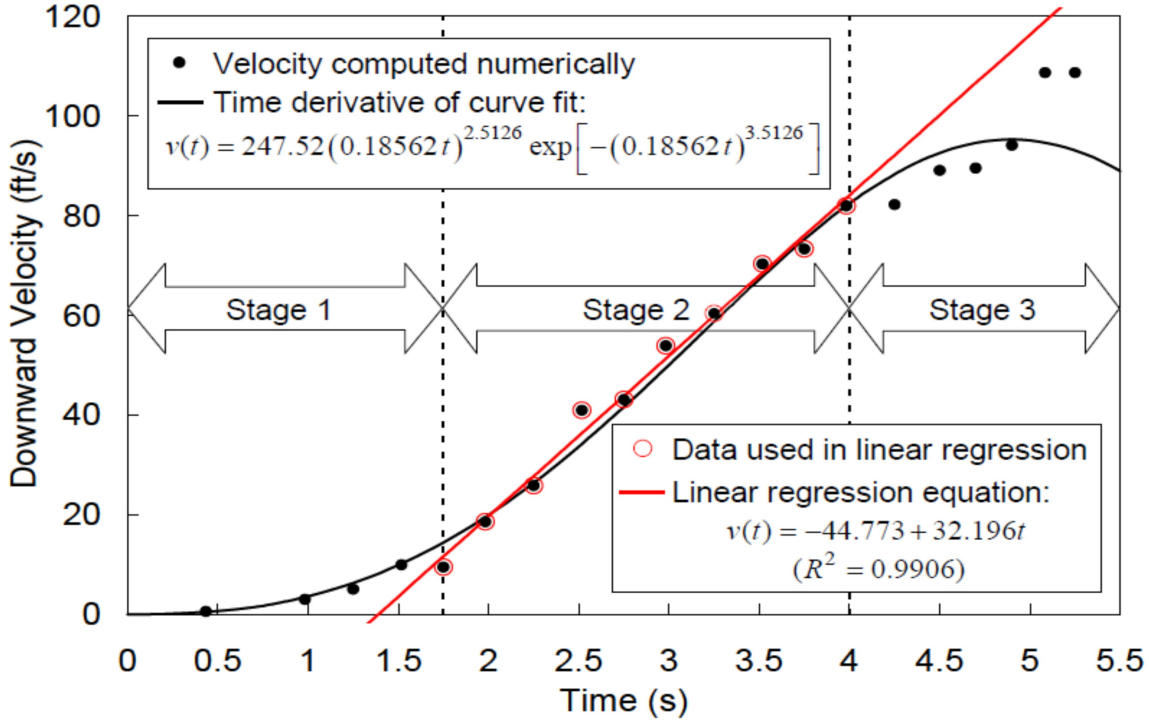


Figure 3-15 from NIST

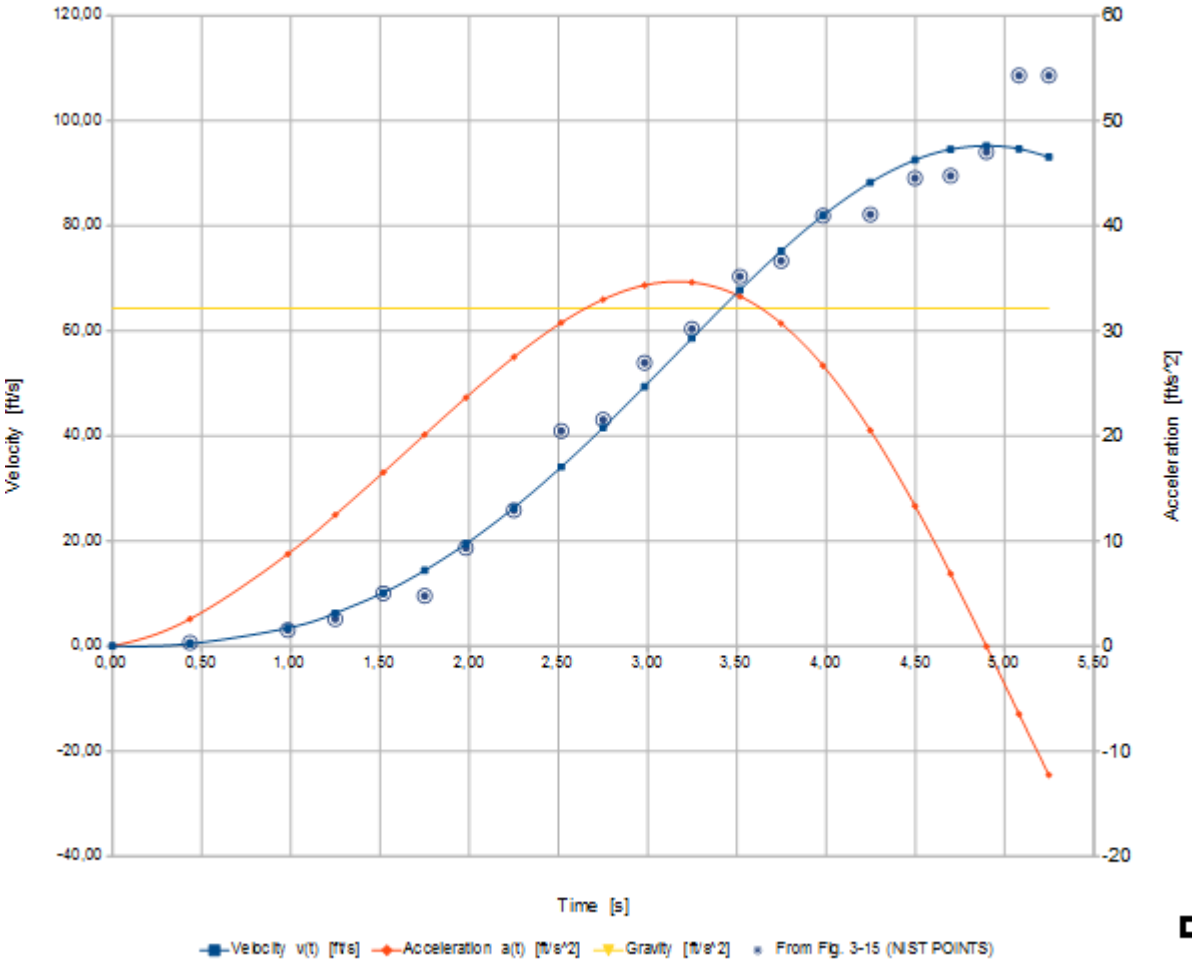
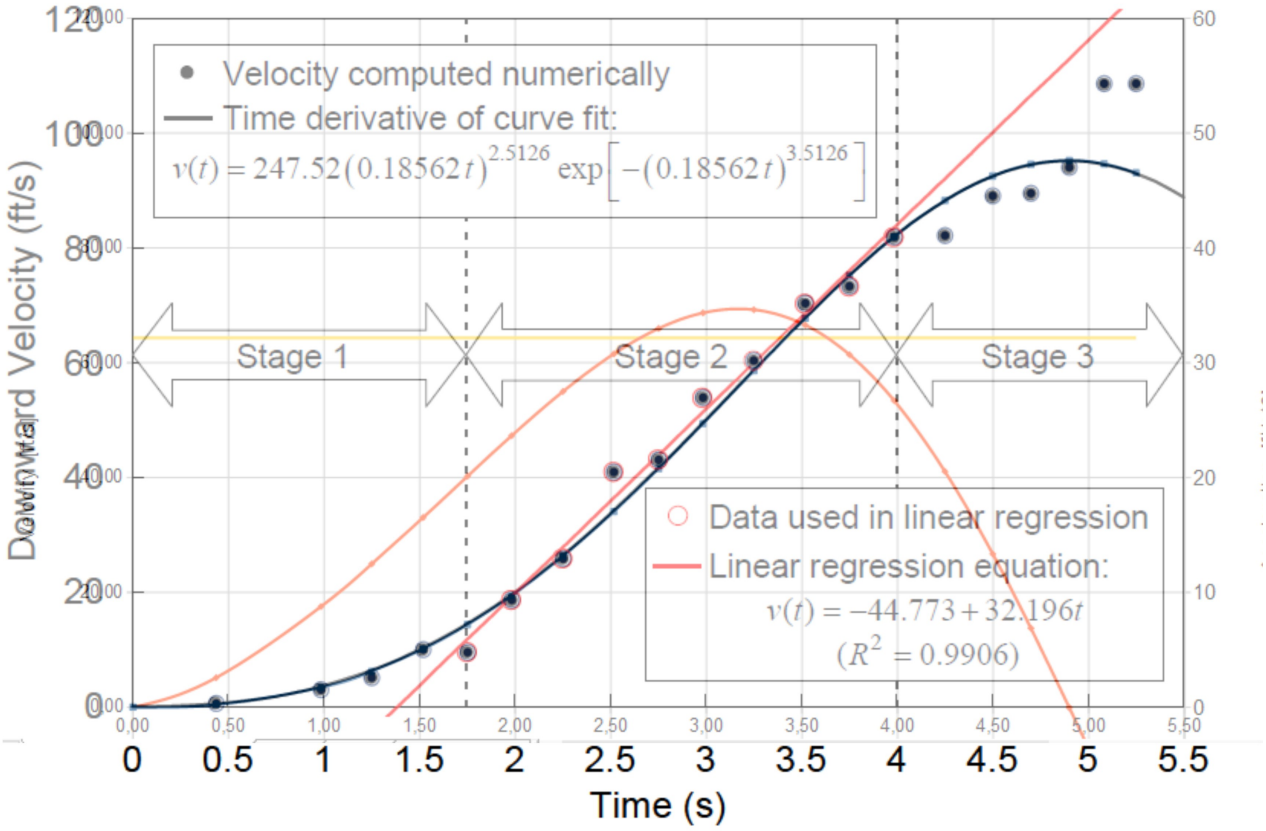


Figure 1 OpenOffice Calc



Overlap between previous 2 figures

As you can see from the overlap, the points data set is reliable. If in the future NIST will release the official data set we will appreciate it.
Residual Sum of Squares of NIST function is 621,5.

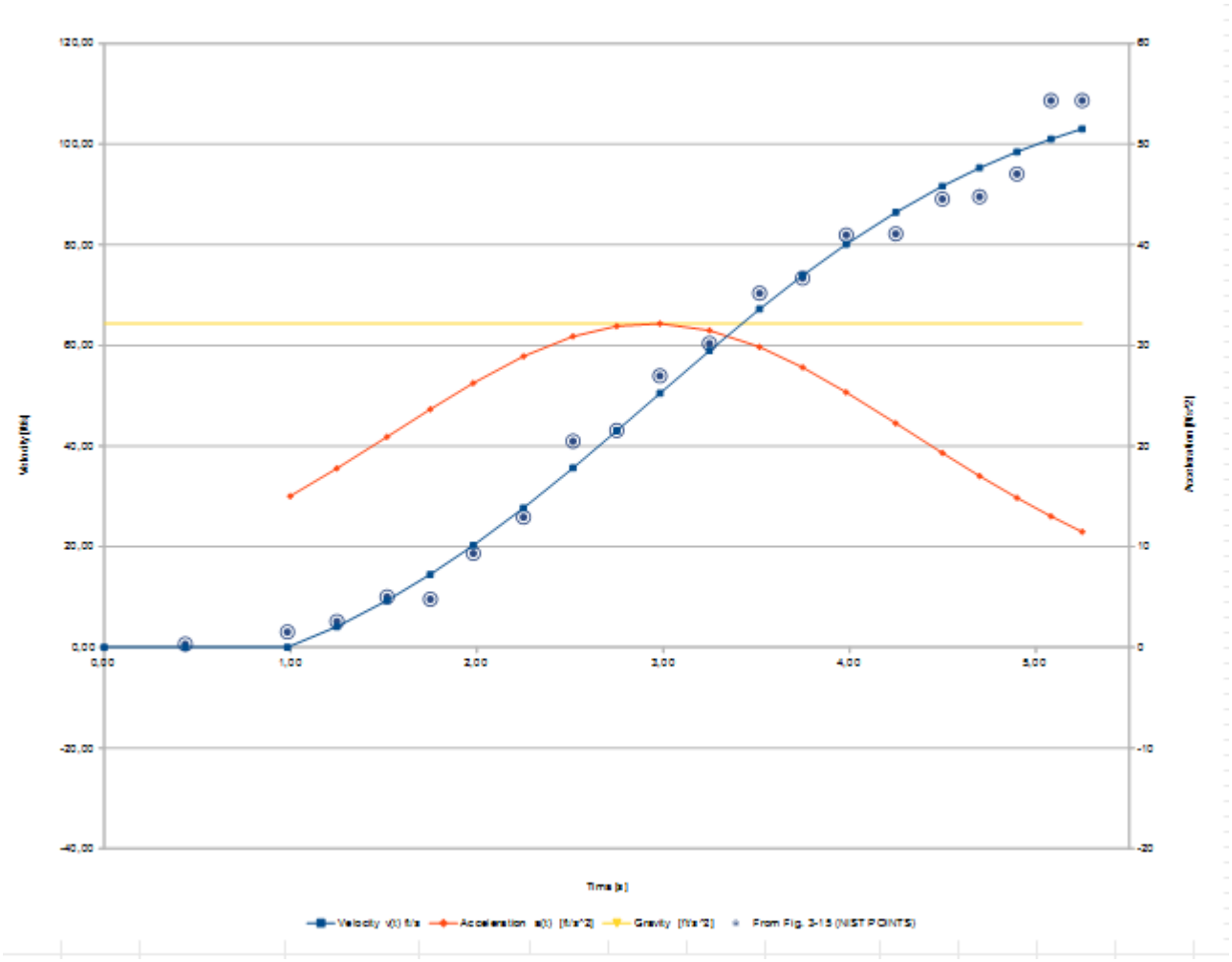
I tried to use a portion of a sigmoid function for the velocity, shifted horizontally and vertically in order to best fit the NIST data points.

$$\left[4al\left(\frac{1}{1+e^{-\frac{t-t_1}{l}}}-\frac{1}{1+e^{-\frac{t_0-t_1}{l}}}\right)\right]$$

l is parameter;
t_0 is the start of collapse (velocity equal to zero); we will assume v(t) =0 for $t<t_0$;
t_1 is the inflection point of the function (point of maximum acceleration);
a is the acceleration at $t=t_1$:

$$\frac{4ae^{\frac{t-t_1}{l}}}{\left(e^{\frac{t-t_1}{l}}+1\right)^2}$$

It is possible to achieve the following results:



As you can see a(t) is 0 for t<0. Moreover a(t) is greater than 0 starting from t_0. t_0 can be considered the start of collapse. a(t) is discontinuous.

- Residual Sum of Squares decrease from 621,5 to 261,1 (-58,0%). Much better model;
- Collapse starts at 0,994 s;
  (18 stories collapse takes 4,4s instead of 5,4s)
- Estimated $a(t_0)$ = 15,38 ft/s^2, about half of g.
- acceleration become equal to g = free fall at t=2,93s;
- acceleration is never greater than g. Please note that NIST function shows an acceleration greater than g, and this is physically impossible!

(See attached file: “Calcolo della velocità e dell'accelerazione NIST5.pdf”)

From:

Giorgio Corvasce
gcorvasce@inwind.it
ITALY

Continuous Original NIST Function - 3 paramnters function

Spostamento Z in funzione del tempo t
NIST POINTS obtained from Fig. 3-15 NIST Final Report

NIST displacement function

$$z(t) = a\left(1 - e^{-\left(\frac{t}{\lambda}\right)^k}\right)$$

NIST velocity function

$$v(t) = \frac{ak\left(\frac{t}{\lambda}\right)^{k-1} e^{-\left(\frac{t}{\lambda}\right)^k}}{\lambda}$$

parameters for z(t) and v(t)

A	379,627	247,520	A * B * K
B = (1/λ)	0,18562	0,18562	B = (1/λ)
K	3,5126	3,5126	K
		2,5126	K-1
		0,001	ε

Unofficial Data Set
Measurements from Image

From Fig. 3-15 (NIST POINTS)

Point	Time (s)	Velocity (ft/s) yi
A	0,44	0,64
B	0,98	3,05
C	1,25	5,14
D	1,52	10,04
E	1,75	9,56
F	1,98	18,67
G	2,25	25,86
H	2,52	40,96
I	2,75	43,09
L	2,98	53,94
M	3,25	60,39
N	3,52	70,36
O	3,75	73,33
P	3,98	81,93
Q	4,25	82,17
R	4,50	89,08
S	4,70	89,52
T	4,90	94,06
U	5,08	108,63
V	5,25	108,63

NIST Curve

Time t [s]	Displ z(t) [ft]	Velocity v(t) [ft/s]	Vel v(t+ε)	[y-v(t)]^2	Acceleration a(t) [ft/s^2]	Gravity [ft/s^2]
0,00	0,00	0,00	0,00		0,000	32,174
0,44	0,06	0,44	0,45	0,039	2,570	32,174
0,98	0,96	3,44	3,45	0,149	8,762	32,174
1,25	2,23	6,25	6,26	1,230	12,478	32,174
1,52	4,41	10,15	10,16	0,012	16,529	32,174
1,75	7,24	14,40	14,42	23,407	20,121	32,174
1,98	11,13	19,45	19,47	0,597	23,650	32,174
2,25	17,27	26,34	26,37	0,228	27,507	32,174
2,52	25,28	34,10	34,13	47,179	30,779	32,174
2,75	34,14	41,58	41,61	2,282	32,991	32,174 (*)
2,98	44,68	49,41	49,44	20,490	34,345	32,174 (*)
3,25	59,03	58,60	58,64	3,204	34,626	32,174 (*)
3,52	76,05	67,78	67,82	6,642	33,289	32,174 (*)
3,75	92,56	75,20	75,23	3,470	30,711	32,174
3,98	110,99	81,95	81,98	0,001	26,700	32,174
4,25	133,64	88,27	88,29	37,170	20,528	32,174
4,50	156,27	92,53	92,54	11,912	13,344	32,174
4,70	174,96	94,56	94,56	25,393	6,879	32,174
4,90	194,03	95,25	95,25	1,430	-0,038	32,174
5,08	211,40	94,66	94,65	195,259	-6,467	32,174
5,25	227,09	93,10	93,08	241,415	-12,262	32,174

RESIDUAL SUM OF SQUARES NIST CURVE **621,5**

(*) Acceleration greather than g in NIST solution. Quite strange.

PORTION OF SHIFTED SIGMOID FUNCTION FOR THE VELOCITY
Discontinuous Function with a(t_0) <> 0 - 4 parameters function (A, L, t_0, t_1)

Spostamento Z in funzione del tempo t
X0 START OF COLLAPSE NEW UNKNOWN PARAMETER

Simple Sigmoid Function

$$\left[\frac{1}{1+e^{-\frac{t}{l}}}\right]$$

Shifted Hor & Vert +
Apply following discontinuity:
z(t)=0, v(t)=0, a(t)=0 for t<t0
z(t)=0, v(t)=0, a(t_0)>0 for t=t0

$$v(t) = \left[4al\left(\frac{1}{1+e^{-\frac{t-t_1}{l}}} - \frac{1}{1+e^{-\frac{t_0-t_1}{l}}}\right)\right]$$

parameters for v(t) and a(t)

A	32,174		
L	1,060	Time constant	
t0	0,994	Start of collapse. Function DIscontinuity	Acceleration at t0 15,38
t1	2,93	Acceleration MAximum time	

Limit Velocity **117,50** **ft/s** = **35,81** **m/s** = **128,93** **Km/h**

0,001 ε

Portion of Sigmoid Function

Time	Velocity v(t) ft/s	Vel v(t+ε)	[y-v(t)]^2	Acceleration a(t) [f	Gravity [ft/s^2]	Velocity v(t) m/s
0,00	0,00	0,00		0,000	32,174	0,00
0,44	0,00	0,00	0,413	0,000	32,174	0,00
0,98	0,00	0,00	9,316	0,000	32,174	0,00
1,25	4,27	4,28	0,764	18,160	32,174	1,30
1,52	9,57	9,59	0,221	21,268	32,174	2,92
1,75	14,82	14,84	27,644	23,960	32,174	4,52
1,98	20,64	20,67	3,868	26,502	32,174	6,29
2,25	28,13	28,16	5,159	29,083	32,174	8,58
2,52	36,13	36,16	23,390	30,978	32,174	11,01
2,75	43,51	43,55	0,179	31,944	32,174	13,26
2,98	50,96	51,00	8,830	32,154	32,174	15,53
3,25	59,43	59,47	0,916	31,460	32,174	18,12
3,52	67,71	67,73	7,056	29,826	32,174	20,64
3,75	74,37	74,39	1,068	27,821	32,174	22,67
3,98	80,61	80,63	1,738	25,386	32,174	24,57
4,25	86,96	86,98	22,916	22,358	32,174	26,50
4,50	92,18	92,20	9,647	19,447	32,174	28,10
4,70	95,84	95,85	39,921	17,187	32,174	29,21
4,90	99,07	99,08	25,126	15,034	32,174	30,20
5,08	101,65	101,66	48,813	13,213	32,174	30,98
5,25	103,73	103,74	24,092	11,679	32,174	31,62

RESIDUAL SUM OF SQUARES SHIFTED SIGMOID FUNCTION **261,1**

58,0 % BETTER THAN NIST

Time	Velocity v(t) ft/s	Vel v(t+ε)	[y-v(t)]^2	Acceleration a(t) [f	Gravity [ft/s^2]	
5,50	106,41	106,42		9,611	32,174	32,43
6,00	110,36	110,37		6,381	32,174	33,64
6,50	112,96	112,96		4,143	32,174	34,43
7,00	114,63	114,63		2,651	32,174	34,94
7,50	115,70	115,70		1,680	32,174	35,26
8,00	116,37	116,37		1,059	32,174	35,47

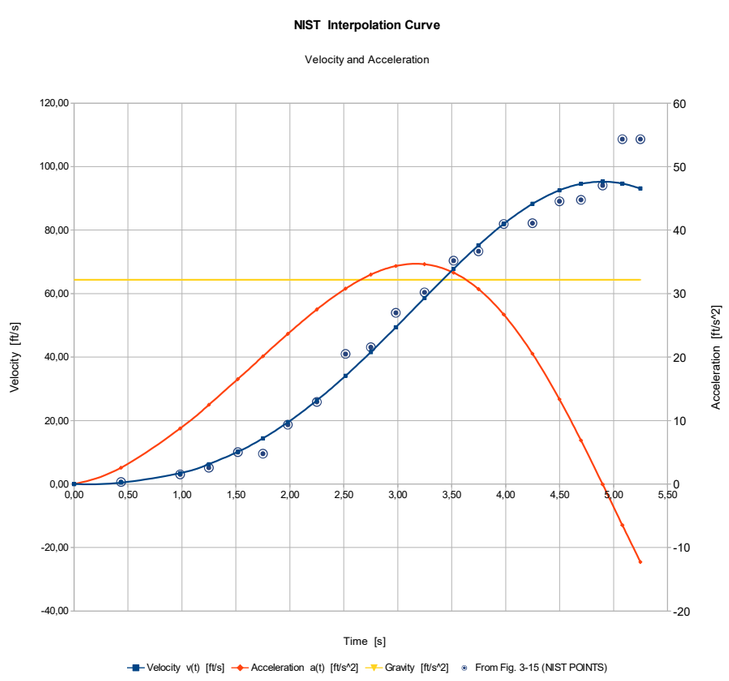


Figure 1 OpenOffice Calc

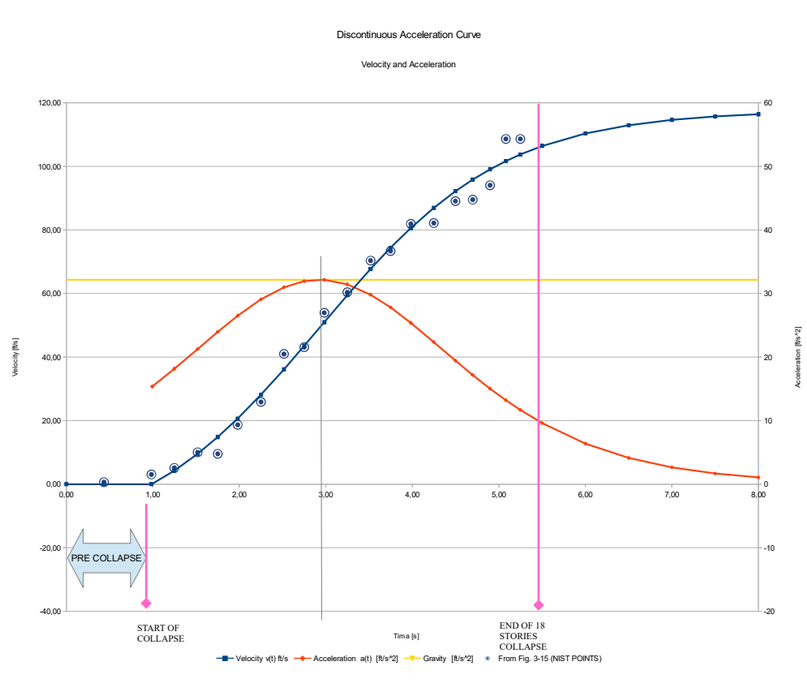
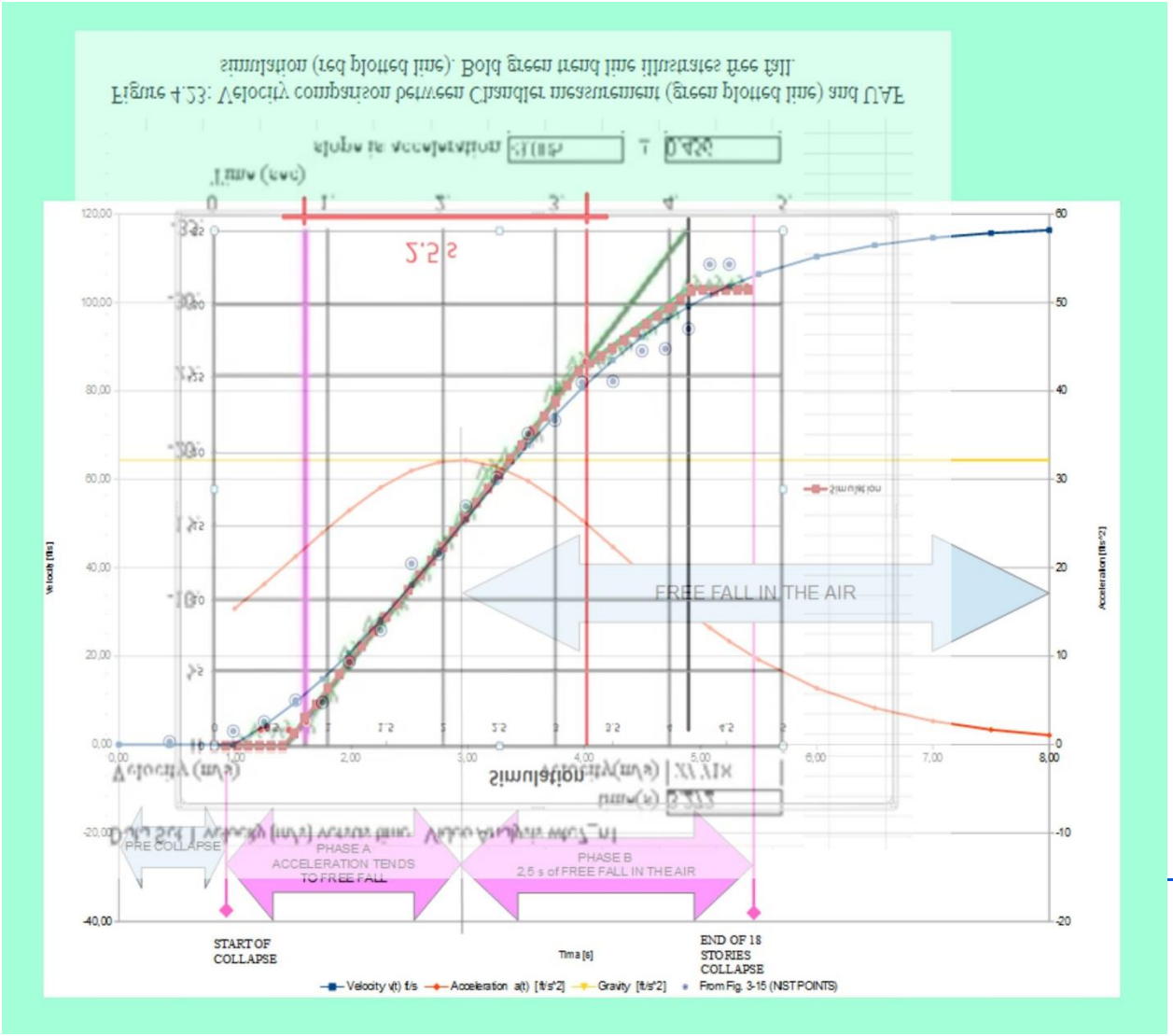


Figure 2 OpenOffice Calc

I'm the Italian electronic engineer. I already sent a comment on 4/11/2019. I would like to provide another comment to the UAF WTC7 Draft Report. I'm the Italian electronic engineer. I already sent a comment on 4/11/2019. I would like to provide another comment to the UAF WTC7 Draft Report. You can find as attachments two .pdf and one .png files.



Please consider the following comments:
1. Please clarify the loading of the building applied in each analytical approach. Considering:
a. Section 1.5 of the Draft Report does not appear to describe how the building was loaded for each approach analyzed.
b. In the presentation “A Structural Reevaluation of the Collapse of World Trade Center 7” by Dr. Leroy Hulsey on September 3, 2019, he mentioned there was no live load at the time of the collapse since building occupants had been evacuated. However, testimony of eyewitnesses (e.g. Barry Jennings and Michael Hess) indicates that furnishings were present in the building after it had been evacuated, which should contribute to a live load in the building.
c. Daily project report entries in the work diary of Zhili Quan describe imposing 10,000-kip loads in the building.
2. A theory circulating in the fire protection engineering community hypothesizes that the subject structure failure was initiated with the cooling phase of the structure, after fire had subsided (ref. Truong, Pham and Chu, “Failure of Building Structural Members During Cooling Phase of a Fire” (21FEB2018) Int’l Conf. on Advances in Computational Mechanics). This theory asserts that rather than expanding off its seat, the girder shrunk and retracted, pulling off the seat.
Based on your analysis:
a. What is the most probable outcome of such a failure mode at Column 79?
b. How widespread and simultaneous would effects of the cooling phase of the fire need to be in order for the structure to collapse in the manner witnessed?

Thank you for inviting me to review this great report. My expertise is on geotechnical engineering, so I invited Dr. _____ in structural engineering to review this report with me together.

We agree with the findings of this technical report based on the methodology used to conduct this investigation and the explanation provided to address the research gap from previous investigation conducted by NIST, ARUP and Norderson.

The report highlighted the basic understanding of how hypotheses are implemented in an investigation and also acknowledged the limitations. The hypotheses in the report were consistent with literature and corroborated with findings in other reports where they concur.

Primarily, the finite element investigation conducted in the studies were very detailed, however, assumptions in finite element models are mostly permitted. Are there any different assumptions used by NIST and in other reports? Different assumptions may lead to different results. Comparison and more justification look needed. Indeed, we agree with the finite element results in this report, but a counter argument could be raised by NIST and others.

It is with great interest and appreciation for the work of you and your project team, that I have read at the website ine.uaf.edu/projects/wtc7about your important valuable research into what happened to WTC building 7 on 9/11 in 2001. I consider your work the best and most detailed scientific research that I know of, that refutes the official narrative about what happened to building 7.In the presentation of your progress report (youtube.com/watch?v=NJAWl8unZeA), I was happy to hear you mention that you worked towards decisions and arguments that are defendable purely through science (5'50" into the video) and that you welcome questions and input (8'15" and 1h06'35"). I hope there is still some opportunity for questions, as I fully agree that if any part of the research in this controversial subject would not be defendable through science, it would jeopardize the effect of the entire study. I have two concrete questions that I hope you will consider:1.At the bottom of the abovementioned website, the project summary states: "Building failure simulations show that, to match observation, the entire inner core of this building failed nearly simultaneously." However, in videos demonstrating the collapse of WTC7 (e.g. youtu.be/KitPimk7W7w), I clearly observe a delay between the collapse initiation and the collapse of the rest of the building. Immediately after the collapse initiation at the east side of the penthouse (~1" into the video), several windows were damaged in the section of WTC7 well below the penthouse. Then, about six seconds after the collapse initiation, the west side of the penthouse and the rest of the building collapsed (~7" into the video).Does this observation correspond to a nearly simultaneous failure of the entire inner core, or should the final phrase of the project summary be reformulated to reflect that part of the inner core failed several seconds before the rest of the building collapsed simultaneously? Note, that this point has already been used as opposing material to David Chandler's work (e.g.youtu.be/1rhY9c_iemA, 1'55").2.In your presentation, you explain that you used SAP2000 and ABAQUS to look at the framing at floors 12 and 13 for fire damage in plan view (10'50") from which you conclude that column 79 moved by about 2 inches in the same direction as girder A2001 (1h00'00"). In this analysis, did you consider the 3D structure of the building and the restraint that the structural components of adjacent floors of the building (above and below floors 12 and 13) imposed upon column 79, whereas any expansion and movement of the girder was mainly determined by processes on the same floor 13 only? My main hope is that you will seriously consider to what extent these questions have been addressed or need to be addressed further within your research before publication, to avoid that the above questions will be used as arguments to reject your entire work. Obviously, if you have the opportunity, I would also greatly appreciate to read your response. In that case, to give you an idea of my knowledge level, I have a MSc degree in both physics and mechanical engineering as well as a PhD in physics (medical imaging). So I am familiar with general engineering terminology though not necessarily an expert on e.g. terminology related to tooling for structural engineering. Also, if you need any clarification of my questions, please don't hesitate to ask. Many thanks for your consideration and for your valuable work, for which you have my full support.