

Originally posted by Steve Smith:

I am really aghast at Ali's statement that Conservation of Energy may be invalid. Tell me more.

And originally posted by Robert Pearlman:

So as not to veer this thread completely off-topic, it's probably best that questions about Ali's theories outside the scope of the Challenger accident be addressed via e-mail

The second post is noted.

As to the first post, the veracity of my statement was established in my previous posts with evidence from reputable source(s) – no less than Wright-Patterson experts before the Moon to Mars Commission, though it (my claim) is neither obvious nor self-evident. It is all related, i.e., my Challenger “dynamic overshoot” study was the springboard to my “pulsing thrust” invention (already established by DOD, NASA and others) which, in turn, was a springboard to the invalidity of the Law of Energy Conservation and more. I will show the “invalidity” of the important Law directly from my Challenger work, as described here and in my previous posts. Actually, this may be the best way to conclude my lengthy posts on “dynamic overshoot.”

Fig. 11 here (from my shuttlefactor report) shows the NASA illustration of “thrust” build-up for two SRMs. I mentioned before McDonald's traces for 26 Motors published in reputable journals. His traces are similar to those in Fig. 11. My comments apply to both.

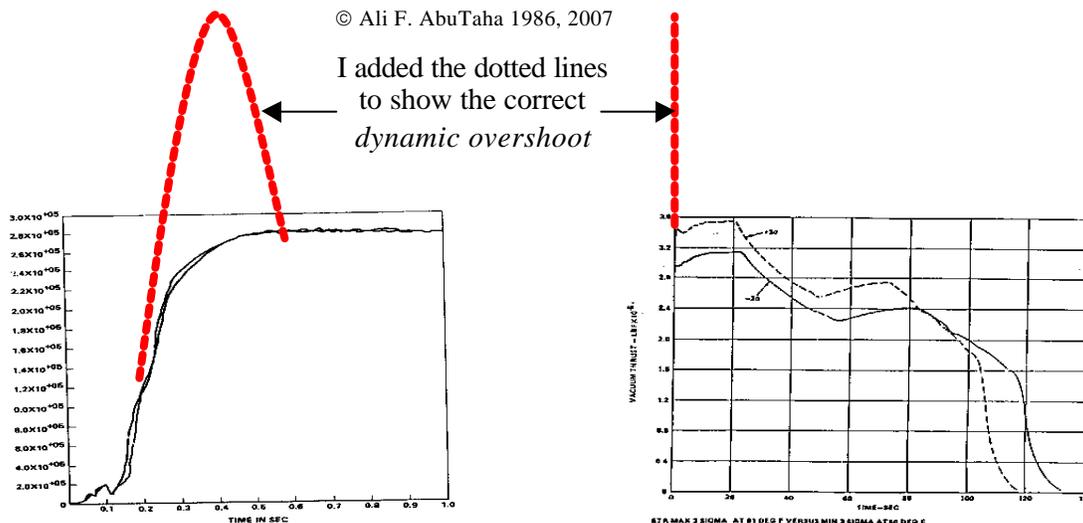


Fig. 11a 1981 NASA Illustration of SRB Thrust for 2 boosters. No *Overshoot*.

Fig. 11b 1990 SRB Thrust Specification. Also No *Overshoot*.

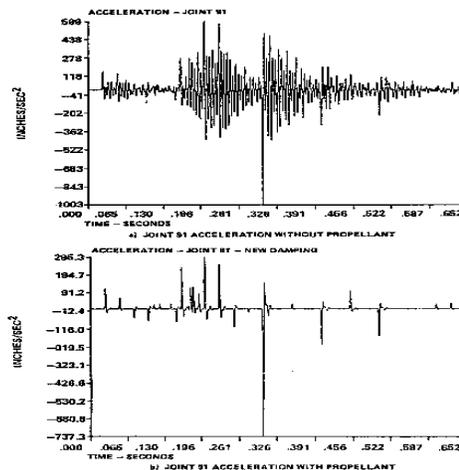
After ignition, the SRB thrust rises to 2.9 million lb. You can barely see it, but the vertical coordinate goes up to 3 million lb. How much dynamic overshoot does McDonald show in his measurements? Zero! How can that be? McDonald has to answer that. My explanation: Thiokol and NASA measure “pressure” in the boosters (with pressure transducers) and convert (as with a calculator) the pressure readings to “force.” This is wrong. I had added the “dynamic overshoot” with the red-dotted lines in the Figure. Notice the sinusoidal (or bell) shape of my first red dotted line and, in particular, the “spike” shape of the second.

How great is the dynamic overshoot for the SRBs? The dynamic overshoot magnification factor for the SRBs is about 96.9, say, 97%. How do we know that? When using the stiffness, damping ratio and other parameters as reported by Dr. Allan McDonald himself, we get the 97%

magnification factor from straightforward transient analysis. So, the parts of the Shuttle experience about 5.7 million lb force at lift-off, and not 2.9 million lb force, as Thiokol and NASA show in their diagrams. Real life is different; the magnification factor is less than 97%, but it is absolutely not 0 (zero).

Why wasn't the "dynamic overshoot" captured before in the SRB tests? Certainly not maliciously, the engineers used "pressure transducers," in their tests. As I wrote *ad nauseam* – the pressure does not overshoot – the 100 lb lady does not become 197 lb because she steps suddenly on a weight scale, but the weight scale will surely feel the 197 lb. One of my points was this; if we are going to design the Shuttle to withstand 5.7 million lb, then let's be smart and use the "dynamic overshoot" to benefit, i.e., use my "pulsing thrust," which can keep the thrust at 5.7 million lb. Please no smart remarks. This is the theoretical or ideal case. Whatever we get is a boon; even 5 or 4 million lb thrust is great. Strengthening the Shuttle over the years to counter "excessive lift-off forces" exacted severe payload weight penalties.

My detractors may say that they used "strain gages," and the gages did not show the overshoot. I used plain, biaxial, tri-axial and other fancy strain gages (because they were cheap) to catch the ephemeral effect long before. I couldn't. The time response of the gages is too slow. You need more sensitive sensors. How about accelerometers? Great idea? Yes. It is not my idea. NASA and Thiokol did that before, they had accelerometers in the vicinity of the SRBs' field joints. I studied their measurements and found the "dynamic overshoot" in the SRBs! That came up in my meeting with the large team of engineers at KSC in October 1986, and a Thiokol engineer was allowed by the senior NASA officer to attend the meeting. In the meeting, the guys called it, "liftoff spikes," you can see it in Fig. 13 (also from my shuttlefactor report – Commission, Vol. II, p. L-121). The Thiokol engineer gave me his card after the meeting, but I didn't follow up with him. Thiokol's engineer was there for the sharp left turn of Hansen; I wasn't. It is legitimate to ask, was McDonald told about the subject of discussion of my KSC 1986 meeting?



**Fig. 13 Dynamic Overshoot Spikes
clearly visible at SRB Ignition**

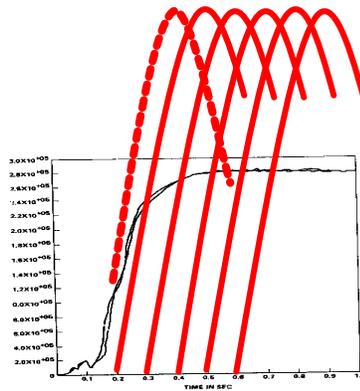
The spike tells a clear story, All you need is Newton's $F=ma$. The acceleration jumps up, the force, F , goes up. It is this simple. The spike occurs at about 330 milliseconds after ignition. So, there you have all the information to calculate the "dynamic overshoot" for the SRBs and compare it with actual measurements. I am not going to get into the math here, you'll find that in my report, which Hansen took forever to evaluate. It is a waste of life to try to prove that "2+2 ≠ 4," because "2+2=4." It is also a waste of life to try to prove that there is no "dynamic overshoot" at SRB thrust build-up, because there is. Since Dr. McDonald was at KSC at the time of the Challenger accident, he could have himself instrumented or produced Fig. 13.

The NASA Marshall engineers easily captured the “dynamic overshoot” for the base bending moment with strain gages in 1982. The overshoot was measured, but not understood. That was the SSMEs’ 1.1 overshooting to 1.9 million lb, which needlessly, I might add, some have ridiculed my using these numbers. Why was this overshoot captured with ease in 1982, but not the SRB’s overshoot in 1986? I mentioned it in my report as follows,

“The base bending moment overshoot happens leisurely. It is not a sudden spike that can be easily overlooked. It does not involve the mix-up of the overshooting forces and the non-overshooting pressures. Its frequency of oscillation is very low, about 0.25 Hz (Commission, Vol. II, L-35). Its oscillation is visible to the naked eye. Its response time to the first overshoot is relatively long, about 2.01 seconds, from Eq. (9). It is measured directly with strain gages at the SRBs’ holddown posts. Its maximum value is easy to calculate.”

Unless the engineers specifically plan in advance to catch the ephemeral SRB’s “dynamic overshoot,” they will miss it. This should be the end of my exposé of the dynamic overshoot subject, which, for me, was necessitated by this ill timed and appropriately titled thread.

How does “dynamic overshoot” become “pulsing thrust?” A simple portrait is given next. Just study Fig. 1. Here, you see hypothetical dynamic overshoot traces that result from rhythmic and repeated application of sudden pulses. For a split second, the dynamic overshoot force exceeds the suddenly applied force. The effect was measured for both the SSMEs and SRBs, and countless other systems. We need to start-stop-start-stop etc. It’s complicated, but that’s where the great engineers in the Air Force, NASA, Industry and elsewhere come in.



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**Fig. 1 Using “Dynamic Overshoot”
Traces to Magnify Thrust**

Next, get rid of the start-stop lines. How do you do this? By clamping and rectifying the pulsed signals in Fig. 1. The result is shown in Fig. 2. I am showing the 200% theoretical limit knowing full well that we will not achieve it. The great engineers of NASA and DOD have not reached 200% yet, but they proudly, and rightfully, declared to the Aldridge Commission that they crossed the 100% old limit, which was imposed by "Energy Conservation." Some will want to know immediately, how much did NASA, DOD, Lockheed Martin and others achieve. Smith will agree that the important thing for the dialogue here is that the 101, and even the 100%, levels were surpassed.

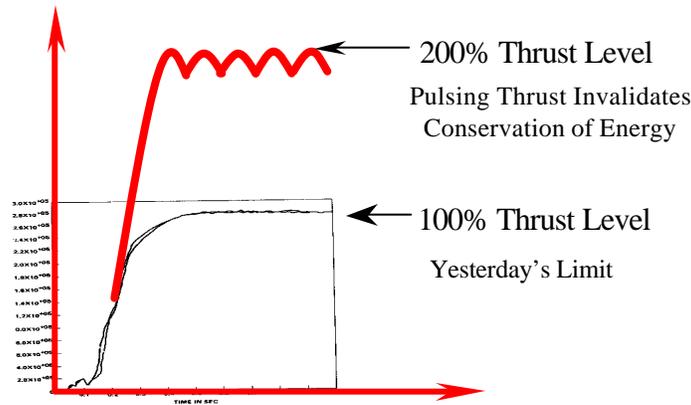


Fig. 4 Clamping and Rectifying Pressure to Magnify Thrust

In summary, my Challenger dynamic overshoot study (1986) is correct, and my pulsing thrust invention (1992) is also correct and it was unique when I filed for a Patent on the invention.

Steve will note that once the 100% limit was passed, the Law of Energy Conservation became invalid. We all remember the "perpetual machines." We couldn't cross the 100% line before. And yet people kept on trying and trying. You couldn't do it. A senior physicist wrote me, about my dynamic overshoot analysis, "*You can't get something from nothing.*" This is how I earned the call names, "certifiable crank" and "one of numerous sidewalk rocket scientists." But, I wasn't shouting perpetual machines. The problem is in our understanding of the most important Law in physics, engineering and other subjects – the Law of Conservation of Energy.

I mentioned before the Air Force 3 5-yr phase program on my "pulsing thrust" invention. I did not hear about it only from the Aldridge Commission hearings in 2004. I knew about it from the start and, as I said before, I tried to get on board the program. The engineers, who took "my" invention, closed all doors in my face!

Steve's "*Tell me more*" shows that someone understands. That's important, but it brings us to the boundaries set up by the moderator. Do the experts from DOD, NASA, Lockheed Martin and elsewhere understand the problem, as I describe it here? I don't know. I had contacted NSF, NASA, DARPA and others about it and tried to make arrangements to disclose my results, but round one crumbled. Maybe, round two will work, but that was interrupted grand style by the "conspiracy" subject of this thread. I spent a lot of time correcting spelling and simple language mistakes. It'll now take a while to clear the conspiracy mess. Every time I glance the words of Rizz, "*Ali AbuTaha, who I'm certain has better things to do,*" I feel guilty. I should really go back to work, but I continue to post here. Hopefully, Rizz and others agree that these posts have been useful. And, please understand I don't have things to send by e-mail now.

I don't know how the "numerous sidewalk rocket scientists," that Hansen equates me with, discover, invent or innovate. I know how I do it; not only with detailed technical analyses, but with thorough background study. Here is a glimpse of my background study of Energy Conservation:

In writing about $E=mc^2$, which is related to the Law of Energy Conservation, Einstein used the conditional "if" in referring to the Law. "If the Law is correct?" kind of sounds like the great man had something in mind. His contemporary, the great French Mathematician Physicist Poincaré, wrote a lengthy paper on the subject and concluded with the question, "What exactly is conserved?" Poincaré declared the Law a tautology, in my words, a song we learn in school and chant the rest of our lives. In "Six Easy Pieces," the late Feynman went through the subject in detail for his students and he concluded with, "*In the last analysis, we do not understand the conservation laws deeply.*" Niels Bohr proposed dumping the Law altogether to get around some quantum problems. I can go on and on with the great debates of Hertz, Mach, Boltzmann, and others about the Law. The historic roots of the issue are much deeper.

Before I close this post, let me say that others were also "aghast." Steve writes, "tell me more." They wrote, impossible, "mirage." My "pulsing thrust" proposals (based on dynamic overshoot analysis) went to Mr. Norman Augustine, among others. On October 2, 1992, then Martin Marietta "Vice President, Research & Technology" wrote me about my invention and dynamic overshoot the following:

"Dear Mr. AbuTaha,

This letter will answer your request for support by Martin Marietta Corporation for services related to your "pulsing thrust 'technique'" by explaining why we believe the "technique" is neither viable nor realistic. We trust you will now close-off further efforts with us on this matter.

We have had this "technique" reviewed by certain expert and, I might add, "openminded" personnel, from our Michoud and Denver Divisions so that we received a cross-section of opinions from engineers, scientists and "students" of propulsion systems. They are unanimous in their assessment that the "technique" is, quite simply put, scientifically and physically invalid: It violates the basic "conservation of energy" laws.

Although certain analogies of a doubling technique may be correct for electrical systems (e.g., voltage doubler), its application to space launch propulsion systems is not. First of all, the work confuses fluid dynamics, and dynamics. It is true (1) that a dynamic system subject to a sudden force results in a displacement essentially twice that of the same force applied gradually and (2) that this displacement is approximately the same magnitude that would be produced by a steady force of twice the magnitude. But, this does not mean that the sudden application has produced a doubling of the force, but only that the displacement is oscillating about the steady value. The same argument would also imply that the force was zero at a slightly latter time. It should also be noted that a dynamic system, driven with an oscillating force at a resonance frequency, could have displacement oscillating between plus and minus infinity. Such displacement is limited only by the time of application of the force and the damping of real physical systems.

Secondly, the "technique" is flawed in its failure to distinguish between available (total) pressure and static pressure. An optimum ideal nozzle brings the rocket propulsive gas to ambient static pressure at the exit plane; optimum real nozzles are, of course, different because of viscous losses and heat transfer to the nozzle as well as the difficulty of production of a nozzle with a variable exit area.

Finally, and stated as basically as we can, there is only so much impulse available from the propellant in solid motors or in the fuel for liquid engines. Thus, impulse (available

energy) does the work of lifting the rocket vehicle; to get twice the energy from the same amount of chemical propellant is, simply, not possible by trying to adjust the rocket's thrust level. The argument that heat losses and stress forces on the engine are the energy losses that the "pulsing technique" will "capture" imply rocket engines are only 50% efficient; modern propulsion systems are far better than 50%.

The idea that the Space Shuttle without SRBs and with pulsing SSMEs can result in a payload capability of 232K lbs (vs. today's maximum payload weight of 65K lbs. (with SRBs) is a mirage.

Martin Marietta has no further interest in the "technique" and any investment of time or money is not justified."

For the purpose of this thread, I'd say that the letter is from a respectable aerospace executive and contains the views of some of our brilliant aerospace and propulsion scientists and engineers. First, I was honored that Mr. Augustine and his VP gave my work the attention they did. Secondly, I was impressed with the quality of the arguments of the technical team – in light of the then accepted state-of-the-art. They knew their craft. They summarily dismissed my "dynamic overshoot" concept, just read their 3rd paragraph. Do I agree with them? Absolutely not, I vehemently disagree with them. This is only one example of how Tim Furniss got in trouble in this thread about his Challenger chapter. As engineers, we throw jabs and punches at each other – technically, and we hope that in the end we find the right answers. McDonald would probably enthusiastically agree with the above MM assessment of my work, which represents his technical position as described in the posts of Hansen in this thread. I personally do not see the MM Team, on the one hand, or McDonald and his colleagues, on the other, plotting, planning and conspiring to hide the dynamic overshoot concept. I mean these engineers did not sit down behind closed doors and said, you know this AbuTaha's overshoot nonsense is true, but let's tell our management, the world and AbuTaha himself that there is no overshoot! This explains why I wrote openly in this thread that I do not believe in the conspiracy angle, espoused by Furniss.

Tim will get upset at me for my next point. He is trying to change the thread title from "conspiracy" to "controversy." But this will get him in more trouble, and he doesn't seem to know it. A "controversy" requires two sides. He leads one side and its legion. He added my name on his copyright without my knowledge, and I hope he didn't enlist me in his legion, also without my consent or even knowledge. Who is the other side? Is it NASA, the agency? Or, is it NASA, the people? If the latter, what are their names? Is it Thiokol or McDonald? I am not telling Tim that their legions will obliterate his. I am saying there is no controversy. The "dynamic overshoot" hullabaloo was over in 1992 – I will say more about these things in future posts, especially, if necessary.

Some unscrupulous people embezzle from other people. I accused some of stealing my works, and everyone read about it in this thread. If Tim Furniss is furious that people stole my works, and without giving me tribute or compensation, I'd ask him to look in the mirror. It took me a while to put it together. I read the early posts on this thread and tried to make sense of things. Then it became clearer to me with the Pearlman-Mason exchange. I'd ask Tim, what was my work doing in the Praxis' Logs? Did Praxis pay you to write, what Mason now calls, "the offending section" or were you a volunteer in the cause of NASA, the space program, or education, or whatever? How much did they pay you for my work? Did you tell Praxis that my consulting fees are steep, and that you and your co-authors could do it for cheap? That's what Dr. Mason got. Mason referred to my work as "offending" and you haven't posted one word about it here – I'll have more to say about this. So far, I only read Pearlman's quotes from the Logs and I was tempted to ask him or Mason to send me the "offending" pages. With your pretense of publishers, TV producers and other great opportunities I let you have some of my material, but I assure you not all of it. Did you tell Praxis, Mason and your co-authors that some sections I sent you were clearly copyright-marked, with my name, not yours? I know my work, and my copyrighted material was infringed on and ineptly presented. You should write to Mr. Horwood, Dr. Mason and Praxis about the infringement. I will.

Mr. Furniss, I cautioned you "in writing" not to claim that you and I, or you alone, investigated the Challenger accident and that "we," together, or you alone made great findings, discoveries and theories about it. Just read the above MM letter. Do you know what those experts were saying? Don't think for a moment that Dr. McDonald, one of our premier aerospace engineers, missed it, and you found it. And don't think because of the way I spar with our scientists and engineers that I don't know and respect their qualifications and professional achievements.

Have I changed my position drastically since the first post? I came on this thread to defend Tim as a journalist, and at his repeated requests. I did that, and my words speak for themselves. But the recent sudden change to a "joint investigation" of the Challenger Accident by Ali AbuTaha and Tim Furniss is completely unacceptable to me, and I told Tim that in writing. Completely unprepared and under difficult circumstances, I posted a number of facts about my work. Didn't Tim also investigate the accident? If anything in my posts in this thread is his, he can claim it openly here, and we'll spar about it. If he made other distinctive discoveries about the accident, post them. The sudden change in me is due to the revelations in this forum. Some of you may think that the Furniss' effort (for his book and his chapter 10) is a joint effort between us. This is causing me great embarrassment. Tim is nearly accusing French of wanting to open a Lemonade stand to sell copies of Tim's book. I don't want any part of that, especially, by someone who seems to have had a Lemonade stand with my work for a number of years. I am not done with the Praxis book(s), and I understand there may be other books about my work without credit, reference or compensation. Tim should list here everything (books, lectures, magazines, etc.) in which he, or others of his associates, used my material for profit, especially materials that had my copyright marks on them. Tim should also know that I don't have the patience and courtesy that Robert, French and others extended him so far on this thread. Of course, I wish Tim great success with his book.

Let me return to the MM letter. I mentioned the late Wilbur Pritchard before. Bill read the letter very carefully and we discussed it at length with my mathematical analysis and diagrams. He asked someone in his office to check "if Norm (Augustine) could see us for lunch" at the MM HQ, a few blocks from Bill's office. A few minutes later, the phone rang; Mr. Augustine was out of town. I don't know how often those guys dined together, but that was not a "polite" rejection as some may say; Mr. Augustine was out of town. Perhaps, the distinguished Chairman of LM today should still read the letter, and his office should put it in proper historic perspective in light of the great achievements made to date.

Ali AbuTaha