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Bridging the Gap

By John Spencer, International Construction Data, Inc.

A body at rest will remain at rest until acted upon by an outside force. This sounds like something Mr. Newton said, but actually it was a *universal* rule long before Sir Isaac was bopped on the head by the proverbial apple. The father of modern physics may have been guilty of taking literary license with a law most small children learn early—that *any* "body" at rest will remain that way until acted upon by an outside force.

The word of course is *inertia*, and it has applied to individuals, groups/tribes, businesses, nations and virtually every other undertaking by humans, beginning around the time we changed our position from the bottom of the food chain to the top. Hunger, predators and shelter could be listed under the category "outside force." The fact is, inertia works on every aspect of this existence. Mr. Newton simply wondered out loud if it could be applied to the "new" science of physics, and lo-and-behold, it did.

Not satisfied to simply link the two with observation (everyone knew what happened when a boulder rolled down a mountain into the living room, no?) Newton combined his observations with the slightly older discipline of mathematics to create formulas and equations to help explain why the living room looks different. In fact, if you could weigh the bolder before it started down the mountain, it is mathematically possible to tell *exactly* where the rock will stop rolling after hitting the living room, and how tall your dog and cat will be. Physics explains it this way:

F=MA, where F=force, M=mass, and A=acceleration

For our industry, however, the rule is slightly different. The body (business) doesn't remain at rest forever, if not moving forward, it backs up. Borrowing from modern physics, the little known and less understood guru of business inertia, Yazoo Pits, explained it this way:

F=MA/e, where e=time, measured in units of Industry Time, called epochs, which are large nonlinear, cumbersome periods of little change. (Loosely related to eons.) It would take an Einstein to make us realize that time wasn't the same for everyone in the universe.

Yazoo was not taken seriously in his lifetime, because he believed the participant/observer could affect the outcome of his equations. Preposterous you say? Consider this. Galileo was jailed for challenging the "absolute" belief that the earth was the center of the universe. When he finally recanted and was let out of prison, he devoted the remainder of his life to the study of motion. Within a generation, Isaac picked up the ball, so to speak, and gave us the "absolute" nature of our physical world, measured in units we could take to the moon. It has always been important to force our understanding on the observable universe. It makes us feel "safer."

It would take a man that today occupies the same "chair" at Cambridge University as Newton did, centuries earlier (Hawking jokes that Newton's probably wasn't motorized), to make us realize that our belief in the "absolute" nature of the physical universe is once again, unfounded. Stephen Hawking proved with his quantum research that the observer/participant could, in fact, affect the outcome of the experiment. He even proved that in certain situations, the result of an experiment *depended* on the question asked, and the answer expected. One top physicist working with Hawking was quoted as saying, "that if you didn't get giddy about the ramifications of that fact, you didn't understand quantum mechanics." Einstein's reaction to the early pioneers of quantum physics was summed up in his famous quote, "God doesn't play dice with the universe." (You would think that a man who made us believe that *all* mass is just an expression of energy, would be a little more open-minded.)

Yazoo, who was actually jailed on a Marti Gras float for being seriously giddy, argued that a thought was the most powerful force in the universe, and he spent the remainder of his life trying to find an equation elegant enough to express it. Of course, the real problem to this day, is finding the right units to measure a thought. (I believe Hawking is on that trail, but just doesn't realize it.)

As luck would have it, I was witness to a perfect demonstration of Mr. Pit's most famous equation. I was talking to a project manager for a large commercial project about the advantages of "prebuilding" his job. The conversation went something like this: Put all the pieces of the project together inside a computer until they fit, answering most R.F.I.s (requests for information) before the questions could stop actual construction; load the information in the form of coordinates to field equipment, robots or total stations; and use the "new" technology to improve the accuracy and speed of his job, using less manpower—seems simple.

His response was instant. There would be no robots or total stations on his job; he had three surveyors with transits and chains, which were good enough when he did it, and it was still good enough today.

I wanted to ask him if he planned on using power tools, or mixing the concrete by hand, but he was much larger than I, and remembering the universal rule of action and reaction, and doing the numbers in my head (he was about 6-6, 280 lbs.; I'm 6-2, 190

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lbs.), I just smiled and nodded. But the demonstration was a good one, and not lost on me. (I've just noticed that the root word of demonstration is DEMON.) The equation for this problem looks like this:

(F)~(MA)/e)(-Rsquared) >0

where F has been transformed from *FORCE* to *FEAR* by ~, the unknown quantity of THOUGHT from the participant. Multiplied by R, the resistance to change, measured in ohms—overt-heavy-memories—is always a negative quantity. It is important to note that no matter what values are plugged in, F will always be less than 0.

That's not to say that inertia is all bad; it is not. The phone books are littered with the bodies of businesses that have changed just for the sake of change, but equally as important, those same halls are full of businesses that didn't keep up with the changes taking place around them.

I was lucky enough to grow up on the Texas coast. As perfect as it was though, I just had to make a change. So, when I was a bright-eyed, twenty-year-old, I rebuilt a VW microbus and set out in search of Alaska. It was March, and the "frozen north" is called that for a reason. Everyone in Fairbanks and Anchorage told me that Juneau was the only place thawed out enough to even stir. It never occurred to me that I wouldn't find work there, so I did—at a small engineering firm with a "progressive" thinking owner.

It was heady stuff, surveying in the wilderness of southeast Alaska, around big bears, whales and eagles, still using pretty much the same tools that the early (American) surveyors had used long before me—transit and chain. But I was "progressive" too. I could compute curves, bearing/bearing, and distance/distance intersections in the field using my slide rule. I had a collection of these: large and small, even a circular one, which was my favorite.

Then one day, a Hewlett-Packard salesman showed up at that little engineering firm in Juneau, AK, and showed the owner a small hand-held "computer" that had sine, cosine, and the most important button of all: *SQUARE ROOT*. In one afternoon, the press of a few buttons, with real speed and accuracy, replaced all of my study and practice with slide rules.

I was hooked! Production and confidence went up dramatically, redefining efficiency. Arithmetic gave way to mathematics; mathematics would give way to video games. Instead of solving simultaneous equations for a distance/distance intersection, we just drew two circles on the screen and picked off the intersections.

The owner of that small business was a perfect example of the same equation as above, with small, but subtle differences: (~), the participant's thought processes have changed F back to force; R becomes C for change (always a positive value) measured in any conve-

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nient legal tender. F is now always greater than S: the SUM of its parts.

(F)~(MA)/e)(Csquared) < S

There will always be those who can make a good living using tried and true technology 10 to 20 years behind the guy on the "bleeding edge." These patrons are quick to point out any problems caused by new machines and methods, and why they will never take the leap. "Wouldn't have happened using the old tried and true methods," they would say, which is a true statement. The problem can usually be traced to an unearned level of trust in the new system.

So, the right amount of inertia is probably healthy. Checking your new technology by using your old methods will be slower at first, but there is a "learning curve" to every new thing attempted. It takes an investment in time and money to make anything better, but if researched and believed in enough, it usually pays back tremendous dividends. That is the real story of America and her business (F)orce. And our industry is very close, if not on the top of that all-important list.

As much as we would like to believe it, the scary truth is there may indeed be no absolutes in the physical or business world, but this is the good news. As we have seen, the intangible variable is you and me, and there will never be a formula for the human spirit. Taking a risk will always be an unknown. That is how America became the most powerful force in history. Her people changed fear to force, and took the chance on change. Resistance to change, inertia, will always be a fact of life, a universal rule to be understood and respected. Sir Isaac Newton knew it to be in the top ten. Everyone from Newton, to Hawking, to Pits, to a school child, knows that an outside force *will* change a body at rest. The trick is to make sure that outside force is you.

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