The Primer

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President's Message...

As we reach the 4th quarter of 2008 we look back at the year that has been and wonder what the new year will hold. We have seen the aggregates business drop by 30% across the US and California has been hit even worse in some areas. The foreclosure rate on houses in some areas of Calif. is approaching 70%. How many of those are second and third homes we will never know, but the fact is that the number of homes on the market now exceeds the demand. There were drilling and blasting contractors that had every drill in their fleet working on new subdivision developments at the first of the year and today are lucky to have a single drill out in the same market. We have seen not only a consolidation in the equipment business but the trend for the larger aggregate companies to absorb the smaller ones continues. With the credit crisis that has arisen over the past few weeks anyone with cash at their disposal can make those purchases on the cheap or at least lower than what they were just a few months ago.

We have an election in less than a month. My editorial opinion is to throw the bums out. Look at who got us into this mess and replace them. That is not at State and National levels, both. It doesn't matter who wins next month, I believe that we are in for a rough 5 years ahead of us.

Now that I have gotten on my soap box and told you what I think, I would like to hear from you. What can we do as the Golden West Chapter in helping out our industry? By working together can we make a difference? Is there a future in this industry in California? Please let me know.

Along these lines I have not heard back regarding next years slate of officers for the Chapter. Randy Messer has someone who would be interested which is positive. Jack Masson wants to help but is not able to be a Board Member or officer. Thank you Jack for volunteering to help. It is not money we need now, but warm bodies with a passion for this industry and the willingness to get involved.

I will set a date for our year end party and let you know. Please keep an eye on the Primer for any new announcements. Take the on-line class that Wes has put together. It is a way of refreshing your knowledge and you might learn a thing or two.

Best regards,

Bill Warfield

Editor's Notes ...

We are rapidly approaching the end of a very eventful year, economically speaking. Belt tightening is going to be a way of life for some time to come. Depending upon which side of the fence you are on, your observation of the cause of our current financial mess could differ from those of others. In actuality, there is enough blame to go around. Yes, a huge number of sub-prime mortgages, the absence of underwriting standards in both commercial and underwriting banks, demand by investors for higher yields, coupled with lax governmental regulation has taken its toll, but a lack of truthfulness by borrowers, a desire to make a quick buck by flipping a spec home, and people trying to live beyond their means has also made a huge contribution. It can also be said that overpaid executives of failing institutions also contributed to the problem, but while I don't condone their making the big bucks while leading their companies down the wrong path, the amount involved in their salaries is a drop in the bucket compared to some of the other causes.

Having invested in various financial instruments since the early '60s, I have experienced several cycles of global financial crises. Although the downturns can be gut-wrenching at times, the economy always rebounds. Companies that are lean and mean and whose leaders make sound business decisions usually come out far ahead of those companies that are top-heavy, bloated and whose business decisions are somewhat less than prudent. The overall effect is to cleanse the field. It isn't all bad.

As blasters, you learned early on to be aware of what is going on around you and to engage in safe practices. Your safety and those around you depended upon it. Later, when terrorism reared its ugly head, you again had to be totally aware of what is going on around you. The same process, but for a different reason. Now, you have another reason to be aware of what you and those around you are doing. You need to analyze your financial situation carefully and make sure that you (and your employer too) are making sound financial judgments. The older you are, the more conservative your decisions need to be. When you are young, you can take a financial hit and still have time to make enough to recover. As you grow older, you don't have that luxury and your investment strategies need to be more cautious.

I'm not a financial planner (except for my own needs) and I don't intend to give out any advice. Everyone's situation is different. It is important however, that you maintain a positive attitude. It's also important that you live within your means and to try to put away something for retirement.

I know how I'm going to vote, but I wouldn't think of telling you how. Just be sure that you do vote on November 4th. It's your right, and it's also your duty.

Cheers, Wes Bender

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Shakin' It Up

with Wes Bender

This article should have probably been titled **Digital Daze**. It involves a look back into the early days of the development of the digital seismograph. Prior to the late '70s or early '80s, blast vibration recording was done with analog devices that either printed directly onto film or onto magnetic tape. The film could then be developed and analyzed, but the magnetic tape usually had to be sent to a consulting group who would then transcribe the data and provide a report. These weren't inexpensive and several companies made a very good living doing this. They also had no particular desire to see devices hit the market that would allow the end user to derive his own data, but it was inevitable that this would eventually occur. They had to change their ways, or watch their business go down the drain. In addition, a couple of manufacturers of analog devices refused to expend the effort and expense necessary to develop digital seismographs and they have since moved on to other fields or have disappeared altogether.

In the anecdotes that follow, manufacturer's names are not mentioned for reasons that are obvious. Suffice it to say that the development of the digital seismograph did not occur without some trials and tribulations. Mistakes will be made and a certain number of problems are bound to crop up when advances in technology are being made. Bear in mind that I utilized units from several manufacturers in the early days so don't assume anything.

One of the very early devices I had would appear to be monitoring properly, waiting for an event to occur, but was actually fast asleep. You could have blasted the geophone off the end of the cable and it would not trigger. This fault was obviously addressed rather quickly.

Two opposing manufacturers promoted different printing technologies. One favored a pen plotter, while the other used a thermal printer. Actually, at the time neither was very good. The plotter had many small moving parts that would accumulate dirt in the field and could quit working. You really had to keep them clean. The pens could also gum up or run out of ink if you weren't paying attention. The thermal printer was simpler, but the resolution was pretty bleak and the resulting records would fade into unreadable strips of paper fairly rapidly. The solution was to make copies of them before they faded too badly. It was obvious that some sort of semi-permanent storage medium would be needed and it was eventually developed. Printers also improved over time.

Other technical issues existed in some of the units. One manufacturer's seismograph would not monitor for more than six or seven hours without the batteries going dead. (Not recording mind you, just waiting for an event to occur.) Another instrument operated on 8 volts. Just try to find an 8 volt battery. This one used 6v and 2v batteries in series. Thankfully, that was changed in their next series of units.

Shakin' It Up (cont.)

One of the earliest units calculated true vector sum and printed it. This was a great help because one no longer had to scan the entire record to find the vector sum (square of each individual channel in a given instant, then add them together and extract the square root of the total).

The problem with the initial run of this early machine, however, was that the true vector sum printed on the record often fell below the reading of the highest individual channel, a situation that is not technically possible. The vector sum will be equal to the highest channel, but only if the other two channels are indicating zero. If any data appears on either of the other channels, the vector sum must rise accordingly. With no means of turning vector sum off, there were a few embarrassing moments until the manufacturer corrected the error in the internal software.

Having sufficient internal memory in those days was also a particular problem. As some indication of what was required, consider that in order to meet an upper frequency response of 250 hertz, the accepted standard, one had to record at 1000 samples per second per channel. (It is universally conventional to have a sampling rate that is at least four times the highest frequency that is anticipated. For research work, ten times the highest frequency is more often utilized. Lower sampling rates could possibly allow a short spike to slip through undetected. This is commonly referred to as the "picket fence effect". (For clarity purposes, it should be mentioned that in binary work we dealing in numbers such as 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, etc., so instead of 1000 we were actually recording at a sampling rate of 1024 samples per second. The difference between 1000 and 1024 may not amount to a hill of beans, but I wanted to be accurate here so that you more knowledgeable folks wouldn't take me to task over it.)

When you consider that there are three channels of motion and one channel of airblast, you are looking at 4096 samples per second of recording. That doesn't include the memory required for all of the other peripheral stuff. Today a few gigabytes of storage can be had for not too many dollars, but back then even a megabyte was unheard of. Various methods of dealing with memory issues were tried, but the method used in one seismograph was particularly fraught with problems. This instrument would record quite well at 1024 samples per second per channel for events of a few seconds, but when one needed to record an extended event, such as in tunnel blasting where the event could exceed anywhere from 6 to 12 seconds, the unit had insufficient memory to store all the data. This manufacturer's solution was to slow the internal clock rate down so that the entire event could be stored. Unfortunately, it was then only sampling at approximately 512 or 341 samples per second, depending upon whether they halved the rate or cut it by two thirds. This had the effect of dropping the upper frequency response to approximately 125 hertz or 85 hertz. The manufacturer's product specification data didn't properly disclose this shortcoming, and many users never even realized it was happening.

Shakin' It Up (cont.)

This problem would usually only rear its ugly head when a particularly high frequency was recorded at these reduced rates, and it resulted in aliasing when the data was digitally processed. Aliasing occurs when a recorded sample is at a frequency that exceeds about half of the sampling rate. It usually shows up as a high frequency waveform (that is usually correct) superimposed over a low frequency waveform (that is the incorrect aliased wave). To their credit, at least one manufacturer (not of the above unit) incorporated an anti-aliasing filter to remove any frequency that came through high enough to be a problem at 1024 samples/sec.

By and large, the digital seismograph manufacturers have succeeded in developing high quality equipment that is capable of recording just about anything we can throw at them. It wouldn't be fair to those manufacturers to disclose their early foibles without also mentioning some of the rather humorous situations that the users managed to get themselves into and also to pass along some other possibly interesting anecdotes. Again, no mention of names in order to protect the innocent (or maybe guilty, if you recognize yourself in this article).

Most digital seismographs conduct an internal check of their sensors, usually when first turned on and then again after an event is recorded. One customer called to complain that the unit would not pass the sensor check when turned on or when he manually forced a check. I knew that his office was in a very shaky travel trailer and so I questioned him as to the placement of the sensors. The geophone block was on the ground outside the trailer, so location wasn't a problem. When I asked him to verify that the cable was securely fastened, his response was, "What cable?" I don't know how he thought the test data was going to be conducted to the instrument. Maybe through the ether....

I also rented units to a company working along the Alaskan Pipeline at Atigun Pass. Winters there were so cold that the units had to be kept in the cab of a truck or they wouldn't function. They needed 250 foot long geophone cables to keep the truck a sufficient distance from the shot. These cables invariably came back in pieces, once in as many as 17 pieces. I'm not sure that the cable manufacturer from whom I was buying my bulk cable wasn't using recycled beach balls and plastic lawn furniture for his feedstocks of insulating material and sheathing..... Eventually I found a source for high quality cable, but by then the Atigun Pass job was finished. By the way, geophone anchoring up there was a piece of cake. Pour a little warm water on the ground, place the geophone on it and in a few seconds it was secure.

I had another client who just couldn't train his employees to respect the equipment. He purchased some seismographs from me and almost immediately they started coming back in for repairs. Without fail, the wiring where it entered the geophone block was badly mangled and the strain-relief was broken. Investigation revealed that his operators would spike the geophone block, but when it was time to move to another location, they yanked it out of the ground by the cable and hauled it away, possibly with knuckles dragging on the ground.....

Shakin' It Up (cont.)

This same client called me at the house one evening complaining that the readings apparently were being corrupted in most of his units. He felt the velocity readings (in in/sec) obtained in the field appeared to be legitimate, but when they downloaded the data to the computer in the office, the data somehow got changed and wasn't reliable. He was calling from the field office and I asked him to open the files on the computer. I also asked what the units were. He responded, "What do you mean?" I indicated, "the small letters after the velocity readings." "mm/sec" he said.... Oops. Things got a lot better after he changed the units in the software on the computer from metric to imperial to match those in the instruments.

There have been several instances where the robustness of seismographs have been tested and they usually came through with flying colors. In one very sad case, I delivered a rental instrument and trained the blasting superintendant in its use. I didn't hear anything from them for about a month. One day I got a call from his office and the complaint was made that the plotter wasn't plotting correctly. In questioning the caller, I learned that the fellow I trained had the unit with him when his pickup was broadsided by a train at a grade crossing. Unfortunately, he didn't survive the accident. The seismograph was thrown out of the truck bed and through the sagebrush and was eventually retrieved. I sent a replacement unit and when the damaged one came back, all that was wrong was that the plotter had been jarred from its mountings. I re-mounted it, tested everything and it was good to go.

In another instance, a customer's seismograph fell out of the back of a truck at highway speeds. Other than cleaning up some cosmetic damage and replacing a badly bent battery hold-down bracket, it was placed back in service.

This same customer had a unit that was buried in blasted rock from a shot. It kept on recording for the duration of the event. The data only stopped because the muck severed the cables. The data up to that point was still in memory and was usable. My customer couldn't be blamed for the unfortunate placement of the instrument either. It was inside a house and the muck came smashing through a wall! (No, my customer was NOT the one doing the blasting. Just doing the recording.) Again, the unit was just fine after the cables were replaced and it was tested completely.

You may wonder how these instruments could take this kind of abuse and still work. Actually it's rather simple. There are very few moving parts in a digital seismograph. The sensors are mechanical but are enclosed in a robust geophone block. They usually survive rather well. The printing or plotting mechanism is usually the only other moving part and they do get beat up and need replacing occasionally. The rest of the important parts are solid state devices that can withstand quite a bit of abuse (unless of course, they are torn apart too). My hat's off to the manufacturers of our modern instruments. Good job, guys.

How Come???

Latest Stock Market Report

Helium was up, feathers were down.
Paper was stationery.
Fluorescent tubing was dimmed in light trading.
Knives were up sharply.
Cows steered into a bull market.
Pencils lost a few points.
Hiking equipment was trailing.
Elevators rose, while escalators continued their slow decline.
Weights were up in heavy trading.
Light switches were off.
Mining equipment hit rock bottom.
Diapers remained unchanged.
Shipping lines stayed on an even keel.
The market for raisins dried up.
Caterpillar stock inched up a bit.
Sun peaked at midday.
Balloon prices were inflated.
And Scott Tissue touched a new bottom.

Longevity...

A tough old Montana cowboy once told his grandson that, if he wanted to live a long life, the secret was to sprinkle a little gunpowder on his oatmeal every morning.

The grandson did this religiously, and he lived to the ripe old age of 93. When he died he left 14 children, 28 grandchildren, 35 great-grandchildren .....
and a 15-foot hole in the crematorium wall.

Governmentium

A Major Research Institution has recently announced the discovery of the heaviest chemical element yet known to science. The new element has been tentatively named Governmentium.

Governmentium has 1 neutron, 12 assistant neutrons, 75 deputy neutrons, and 224 assistant deputy neutrons, giving it an atomic mass of 312. These 312 particles are held together by forces called morons, which are surrounded by vast quantities of lepton-like particles called peons.

Since Governmentium has no electrons, it is inert. However, it can be detected easily as it impedes every reaction with which it comes in contact. A minute amount of Governmentium causes one reaction to take over four days to complete when it would normally take less than four seconds.

Governmentium has a normal half-life of three years; it does not decay, but instead undergoes a reorganization in which a portion of the assistant neutrons and deputy neutrons exchange places. In fact, Governmentium's mass will actually increase over time, since each reorganization will cause some morons to become neutrons, forming isodopes.

This characteristic of moron-promotion leads some scientists to speculate that Governmentium is formed whenever morons reach a certain quantity in concentration. This hypothetical quantity is referred to as Critical Morass.