NOW HEAR THIS- - -OR NOT
Non-Destructive Testing Beyond Human Hearing

Today, most people are familiar with the terms ultrasound and ultrasonic. This was not always so. In fact, many of our members are older than the common use of those terms. Regular use of ultrasound technology in manufacturing, medicine, and other disciplines is rooted in the explosion of technological developments during and immediately after World War II.

Companies such as boilermaker Babcock and Wilcox began use of ultrasonic technology to test metals in the 1950’s. AT&SF Locomotive Number 2926, built in 1944, was already retired by then. Not until the 1970’s did the Federal Rail Administration (FRA) develop standards that led to regular ultrasound test (UT) of steam locomotive boilers, rail and other metal components.

NMSL&RHS President, Dr. Mike Hartshorne, is a radiologist with extensive ultrasound experience- - - on people. UT of a large locomotive boiler is just a bit different, and was an enlightening experience for Mike and his crew. In the following report, Mike describes the use of ultrasound to meet FRA steam locomotive boiler certification requirements.

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THE ATSF 2926 UT PROJECT
By Mike Hartshorne

During the past year, the entire pressurized boiler for ATSF 2926 has been mapped, and ultrasound measured for metal thickness—inside and out.

The resulting data of both stayed and un-stayed portions of the boiler were recorded on detailed drawings. That included the firebox, combustion chamber, smoke eld, and record the readings. It wasn’t so easy. The UT team thought measuring this flat part of the wrapper sheet was difficult—until they got into the tighter places. Then they realized the outer wrapper sheet was simple compared to the rest of the job.

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Completion of the ultrasound project: PRICELESS!!!!

Sponsored Flue Tube

= Sponsored Flue Tube

This flue sheet diagram will be updated quarterly to show progress of flue sponsorships.

GIL BENNETT 2926 PAINTING

We still have a few signed copies of Gil Bennett’s painting of 2926 steaming past red cliffs near Gallup. Order yours today.
2926 MILESTONES
by Bob DeGroft, CMO

Two years and a few months ago, we finished the restoration of the locomotive tender.

It was a significant milestone for our hard working group and it changed the way our efforts are perceived by the general public. Until then, it was very difficult for us to convince industry skeptics and the public that we were actually accomplishing something. We knew we were making progress but all visitors saw was piles of pieces and parts. There many steam groups around the country that did not get this far and stalled due to funding or support problems. We were in danger of being included in that bucket.

The results of having a finished tender to show are dramatic. More volunteers signed up, more workers came on site. Cash and in-kind donations increased dramatically. Our “Sponsor a New Flue” program was well received and about 43 have been sold. We are being talked about in trade papers, magazines, and websites in a positive manner.

People now believe what we have known from the start. We are going to ‘get her done’.

The Latest Milestone

When the tender was done, we shifted our efforts to the engine. She is now stripped of her appliances, tubes, flues, superheaters, plumbing and jacketing. We are starting the actual rebuild of sub-assemblies and appliances.

Due to the increased donations and fund raising projects we now have enough funding in place to order all of the replacement tubes, flues, and superheater tubing. Timing was perfect. The steel market dropped through the floor this year and we were able to get the items at a huge discount. They should arrive in October and we will be able to start the boiler refit.

We are reviewing the results of over 7,000 UT measurements and shortly we’ll know what must be done to bring the boiler shell up to spec. No “deal breakers” were found.

With the flues on hand and funds to buy rigid stay bolts we now have plenty of work. We’ll be very busy for the next twelve months.

Many have asked us when we expect to get her back under steam. We have answered that question with a lot of IF’s, but now the end is in sight and 2926 WILL be on the rails again.

We still need more funding, but the major hurdle has been crossed. Keep the donations coming, buy a tube or a flue, get your friends to join and by all means drop by and see what’s been going on!

BANGING ON A 2900

Larry Lukash

In the year 1940 in a borough far, far away was born the son of a tower man who worked for a subway system. The borough was Manhattan. The city was New York. The new arrival was Larry Lukash. According to the genetic theory of Railroading Larry’s mechanical interest, love of trains, and eventual involvement with the 2926 was foreordained. (The latent gene for trains is usually an autosomal dominant found on a Y chromosome.)

Larry’s genetic prediction for things mechanical led to technical school, mechanical training, and vehicle restoration. (Read on for more about the restoration of a beautiful Corvette.) The final step of Larry’s westward migration led him to 1833 8th St. NW in Albuquerque where he found AT&SF 2926 undergoing restoration to operating condition.

Larry was thrilled! Here he found a group of guys who were in need of his skills—and they were working on a steam locomotive. He signed on.

Larry’s life hasn’t been all mechanical and technical. He did have a lot of other “nature and nurture” determinants in his life. As a youngster, he became a Mets, not a Yankee, fan. He roller-skated on Saturdays and Sundays when he was a kid. He received a thorough grammar school education at St. Thomas Aquinas Catholic School.

With grammar school behind him, the latent genes began to show. He attended a high school that emphasized aviation vocational work with academics in a building on 63rd street and vocational education on 64th street where graduates were certified in Airframe and Engine skills.

Even before high school, Larry became intrigued by steam. In summers of the late 1940s he spent time with steel mill employee relatives in Bethlehem, Pennsylvania. There he could run down to the yards where the Pennsy, Reading, and Lehigh Valley Railroads mixed it. He was fascinated watching steam locomotives. Little did he know they were at that time heading for near extinction. Nor did he know that he would someday help bring one back to life.

After high school the aviation business wasn’t hiring. Never afraid of something new, Larry took to sheet metal work. For three years he built hotdog street carts for two different employers. In 1961, the sheet metal work came to an end—he was laid off.

Larry then switched from sheet metal to another discipline requiring hand-on skills. He hooked up with some friends from his teenage years. This time it was carpentry. For the next 14 years, he...
of the boiler was reached by crawling over the frame under the boiler. Boiler; and perched on scaffolding on the side of the boiler. The outside bottom of weather came. Unfortunately, readings were carefully entered into charts drawn to represent a specific portion of the boiler. They squeezed below the barrel of the boiler; hanging down on the crown sheet; inside the box, 6 siphons, front and rear flue sheets, doublers on the first, conical and third course, man way, steam dome, air reservoirs. and more were meticulously mapped and scanned.

John Taylor, Randy McEntire, Bob Scott, and Pete Adair, and I formed the A-team. Others joined in on occasion. After serving as trainer for the rest of the crew, I joined the crew rotation, and the UT work got underway.

The guys on the team were promised nice clean ultrasound work with no heavy lifting. A grid in yellow paint was constructed over every surface, mostly in 8” blocks with a corresponding drawing. Unfortunately, yellow paint pens only work really well oriented on horizontal pieces of clean metal. There are no such surfaces on a locomotive. The yellow paint pen does work well on fingers, clothing, and faces in any orientation, however.

Before each day’s work the ultrasound machine was calibrated against gauge blocks and recorded for CMO review. Measurements required spot grinding and polishing of the grid intersections where readings would be made. This was done to ensure a smooth surface for good contact with the transducer.

A good slobbering of medical ultrasound gel was applied at each intersection. Excess gel wound up on gloves, coveralls, helmets and faces of the ultrasonologists. That’s OK, the gel is sanitary. The rust and grease it suspends are not.

Measurements at grid intersections were recorded in numerals painted on metal at the grid points and penciled on the drawings. They had to be done upside down on the crown sheet; inside the barrel of the boiler; hanging from safety harness on top of the boiler; and perched on scaffolding on the side of the boiler. The outside bottom of the boiler was reached by crawling over the frame under the boiler.

The data also will be used to create the complex geometry of the boiler and the 47 sheets of data that are fed into his calculations. The data entered is used to calculate minimum boiler wall thickness to operate 2926 at 300 psi boiler pressure. The result of the calculation drives needed boiler repairs. It will show which areas can be trusted as is, which need build-up welding, and which need new steel.

The data also will be used to create the Federal Rail Administration Form 4 (BOILER SPECIFICATION CARD). The FRA regulations, including Form 4 are available online if you are curious. Its six pages look simple, until you’ve seen Wolf’s calculations covering the complex geometry of the boiler and the 47 sheets of data that are fed into his calculations.

Congratulations guys! Now, you can add more duties to your busy work schedule.
worked as a union carpenter. He liked the relative independence of doing carpentry work (ask him about building airport counters without any plans).

During his carpentry period, Larry also served in the National Guard. From ‘63 to ‘69, he spent his National Guard summer camps at Camp Drum as a wheeled vehicle mechanic in an artillery battalion. There he gained additional mechanical experience.

Larry’s guard duty just may have revealed a bit of stereotyping. His Guard battalion contained a lot of hard partying firemen and policemen. As a vehicle mechanic, he worked closely (and partied with them). Their 105mm, 155mm howitzers and 8” artillery made a lot of satisfactory noise. One wonders if there might be a connection between firemen, cops, and loud noises that Larry found interesting. (Maybe we should ask New Mexico Artillery Company President, Ken Dusenberry/NMSL&RHS member, a retired policeman, about this. He and Larry seem to have an affinity for loud noises.) But enough about National Guard maneuvers, let’s get back to Larry’s civilian life.

In the mid 1970’s, after working at odd jobs for a while, Larry got a really good job with the New York Port Authority. It was a job he worked until he retired in 2001. In fact, only eight months before the World Trade Center was hit by terrorists on 9/11, Larry was at his retirement ceremony in the World Trade Center office of the Port Authority.

A few years later he and his wife moved to Ventana Ranch, on Albuquerque’s west side. The move followed a number of visits that Larry and his wife had made to the Albuquerque area to see members of her family.

Over the decades of his working life living in Valley Stream, Long Island Larry had time to indulge in the restoration of what started as a $900 basket case Corvette. He paid for it with money earned in the National Guard. After many hours of loving labor, it became a gorgeous “re-sell red” machine worth $35,000. He rallied with a corvette club for a time, but sold the machine in 2005. I think he misses it.

When it wasn’t the ‘vette occupying his free time, Larry was working on an HO layout. (Obviously, the latent train genes were still at work.) Unlike the ‘vette, the HO layout made its way to Rio Rancho, carefully boxed up by Larry so that it did not lose a blade of grass. Now it is expanded and occupies one of the bays in his three car garage.

Larry’s genetic predisposition to like steam engines took over his life when his rail fan brother visited him in 2007. While on a RailRunner trip to Belen the conductor told the brothers about the ATSF 2926 restoration and the two did the rest. They found the locomotive for a drop-in visit during a work session.

Next thing you know Larry signed up and began to show up for work sessions at the 2926 site. And he fit right in. After all, he had the experience of the Corvette restoration AND an innate interest in railroading reflected in his passion for the HO layout.

Since joining NMSL&RHS, Larry has been handy in a variety of jobs and has been a lot of fun to work alongside. What a great way to spend a productive retirement with new friends! When 2926 runs he’ll certainly be in line for a cab ride. We’ll need a wide angle lens to take a picture of Larry’s grin.

(Continued from Page 2)

2926—OPEN HOUSE—2009
SUNDAY SEPTEMBER 26
9:00 AM TO 4:00 PM
1833 8th St NW
(4 blocks south of I-40 between 8th and 12th Sts)
—FREE HOT DOGS AND SOFT DRINKS—
—LIVE MUSIC—
—FUN FOR THE KIDS (of all ages)—

Get a close up look at an important part of New Mexico’s history that is being brought back to life.

Come down and check our progress in restoring AT&SF Steam Locomotive Number 2926 to operating condition.