

GE 23 TON SWITCH ENGINE

HISTORY

This switch engine was built in 1941 by General Electric. It passed through many hands, and ended up at a refinery near San Francisco Bay.

Through the years, the switch engine was updated by removing the 1941 Cummins diesel engine and replacing it with a Cummins NHC 250 engine built in 1974. Many modifications were made to the engine to adapt it to the switcher. At some point in its life, due to a poor design, the bell housing cracked, and the engine was idled.

It sat up at the refinery for many years, and in 2016, the engine was donated to the Santa Clara River Valley Railroad Historical Society. Because it had been idle for so long, mud dauber wasps had taken up residence and turned the cab into a mess. The electrical and engine compartments were also a mess with cobwebs and dirt.

CONTROL PANEL



COMPRESSOR, MAIN SWITCH & GENERATOR



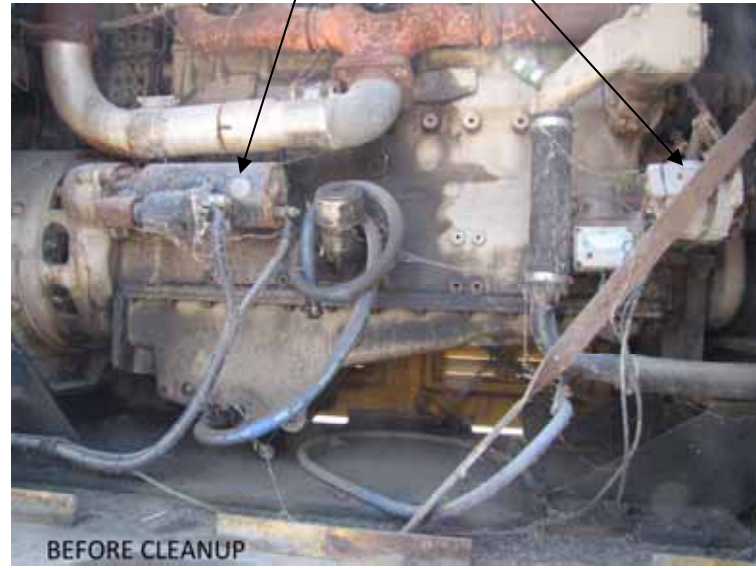
OLD 8 VOLT BATTERIES



LEFT HAND SIDE FILTERS, AIR CLEANER



RIGHT HAND STARTER, ALTERNATOR



We had a work party clean out all the mud dauber nests and remove the rusted floorboards. We also cleaned out a lot of the cobwebs.

DETERMINING THE ENGINE CONDITION

One of our first tasks was to remove the valve covers from the engine and see what shape they were in. Much to our surprise the rocker arms and pushrods were in good shape. We had half expected to see a pile of rust or sludge in there.

We removed the injectors and sent them to be cleaned and adjusted. We also poured some oil and transmission fluid into the cylinders to help loosen them. We also removed the starter and had it overhauled

OVERHAULED STARTER



What we did was all well and good, but we had to face the biggest problem which was the cracked bell housing. Our analysis of the problem was that the diesel engine was supported at the front, but relied on the bell housing to provide support for the rear of the engine. The bell housing was cast iron,

and was not designed to handle that kind of stress, and eventually cracked on both sides, rendering the engine inoperable.

We designed an adjustable support for the rear of the engine, and installed it temporarily for a fit check. The results were very encouraging, as the cracks in the bell housing closed up!

We also found a 9/16 inch hole in the back of the engine (arrow) to which we can bolt the brackets. We put a wrench on the back of the generator, and we were able to turn the engine. It did take a bit of effort, but we realized we were not only turning the engine crankshaft, but also the generator rotor!



HAND BRAKE

In the meantime, we attended to another problem brought on by the inactivity of the engine and the close proximity to San Francisco Bay. The hand brake next to the battery box was frozen with rust. We moved the pawl and wire brushed the area around the gear. We then built a dam around the gear with plumber's putty and filled it with penetrating oil. We wire brushed the underside of the shaft and the plate holding the end of the shaft. We also applied penetrating oil at both places. Our plan is to let it soak for a while then try to move the hand brake. We will also try jacking the shaft from the bottom to break it loose. If all else fails, we may have to use a torch.

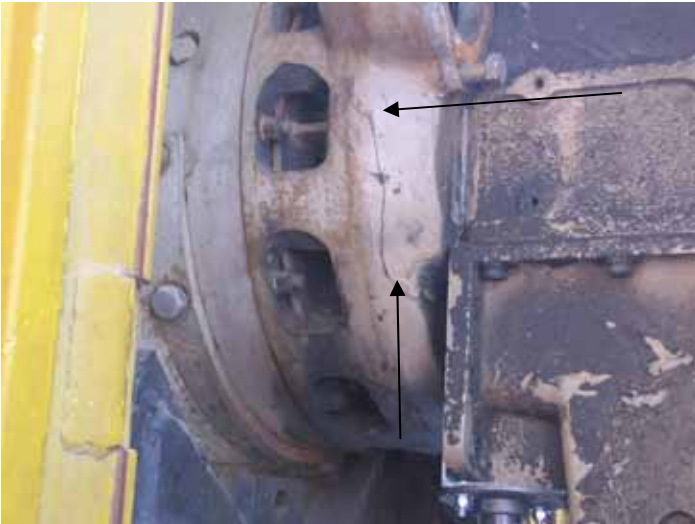
JACK



After dealing with the hand brake, we squirted the door latches on both sides of the engine as well as the electrical cabinet latches with WD-40 to free them up.

BELL HOUSING REPAIR

We sent the photos of the bell housing to Lock n Stitch to get a quote on them coming here and making a permanent fix. I received a response from Lock n Stitch requesting the length of the cracks and the material thickness. We made the measurements, sent the data to them.



We received a response that they were worried that someone had welded the bell housing and painted over the welds, and it hardened the cast iron so they could not drill it. They requested that we wire brush the areas to remove the paint and send them photos so they can see if it had been welded.

We wire brushed the areas with a wire wheel and were able to get some good pictures of the bare cracks. We forwarded the pictures to Lock n Stitch for them to give us an estimate.



We got an estimate from Lock n Stitch, but it was so far outside our budget that we could not agree to their estimate.

We are looking at other methods of securing the cracks before we try to start the diesel engine. I have an idea for a much simpler version of what Lock n Stitch proposed.

GETTING THE ENGINE RUNNING

We finally got the right size bolts to fasten the brackets to the engine. Next time we work on the engine we will drill the brackets in place for a permanent installation.

There is still a lot of work to do on the Cummins diesel before we get it running. The tasks are:

1. Install pushrods and injectors
2. Adjust rocker arms to factory specifications
3. Replace rocker arm cover gaskets and reinstall covers
4. Reinstall starter
5. Inspect all rubber hoses and replace as necessary
6. Drain and refill radiator
7. Drain crankcase and replace with 5 gallons of oil
8. Replace air, oil, fuel and fuel/water filters
9. Connect batteries to starter
10. Cross our fingers