Willard Says……

The Saga of the Naked Dredge

began nearly fifty years ago. My introduction to sand and gravel dredging began when I was assigned to assist Les, a veteran Nebraska pumper, with the task of building a dredge and a sand plant. Les had all the plans in his head. The accumulated components included a bunch of (mostly) empty oil drums; native lumber planks and beams; an 8" x 10" dredge pump of doubtful parentage; a castoff 6-71 Jimmy diesel; an old truck loadout bin; spikes; many pounds of #9 black annealed wire and an old end loader to use as an erection crane.

We nailed planks and beams together to make the "dredge hull". We wired all the oil drums that would fit onto the bottom of the upside down "dredge hull." We dragged this collection of lumber and oil drums over next to the water, tipped it up on edge and let it flop over into the water. The hull launching went without a hitch. We loaded the pump and engine on the floating hull. The pump and engine were spiked down to the plank floor. We bolted a couple of sturdy beams to the side of the platform to form a hoist frame to support the end of the suction pipe. A short section of suction sleeve connected a 90-degree elbow on the pump inlet to the suction pipe, which kind of lopped over the side of the platform.

The Les-designed hoist winch was a pre-MSHA, dangerous-looking contraption he had put together in the shop using not over $89 worth of components. He told me that the secret to this winch design was the wood. The clutch and brake friction elements had to be "piss elm". No other wood would do. It turned out that his winch did do the job, however, it required a lot of loving care. Maybe he got some bad piss elm.

I digress.

The plant was the classic Nebraska spread table affair built atop the truck loadout bin. I say classic Nebraska because on my first trip through that state in the late forties I saw a lot of these sand plants strung out along US 6 as it paralleled the Platte River.

The dredge discharge pipeline—supported on oil drums of course—came ashore and elbowed upward to rise above the high side of the inclined spread table. The spread table was a 16-foot square platform made out of native planks and supported on columns atop the truck loadout bin. The planks were coated with hot tar to seal the gaps between the planks and to form an abrasion-resistant coating to protect them.

The stream of slurry that spewed out of the steeply inclined dredge discharge pipe arced over and cascaded down over a piece of inclined, large-opening screen cloth that was fitted to the front of the doghouse. The oversized rocks were kicked out of the stream by the grizzly screen and fell to the ground.

Gravel, sand and water passed through the grizzly screen entered the doghouse, a three-sided wooden structure that directed the slurry down onto the spread table. The slurry spread out as it flowed down the inclined spread table and off the edge onto two layers of stationary, inclined screen cloth. The gravel fell off the surface of the first layer of screen and down into the elevated truck loadout bin. The coarse sand, the specification product, passed through the first screen and was retained by and fell off the second layer of screen cloth. This product was flumed out to the east. The fine sand that passed the second screen was flumed out to the west. The efficiency of this plant cannot be equaled. Required no power, made no noise, had no moving parts and made four products using only gravity.

The production capacity of the plant was never tested because dredge operation was erratic and frequently stopped. Very frequently. Production stopped whenever the plain suction threatened to plug and was snatched up to pump clear water. It stopped when a cave-in stuck the suction and caused the pump to cavitate and lose prime. It stopped when it was feared that the discharge line was about to plug and clear water was pumped to clear the line. It stopped when the discharge line did plug. Les assured me that this was how it was done. A vacuum gauge was the only instrument. Les said that was all we needed to accomplish what, for all I knew, was state-of-the-art dredging.

When I recall that experience and compare that barely floating contraption to the “well dressed” dredges we build today, the term “naked dredge” comes to mind. It was bare bones dredging. It was as basic as a dredge could be and still cause a flow to come out the end of the discharge pipe. And most important, it made the owner a lot of money.

That was over forty years ago and surprisingly, there are still “naked dredges” in operation today. While these “naked” dredges are pretty crude compared to the modern machines we manufacture today, they have a couple of features that keep them going. They are paid for and they are still making money for their owners.

It was twenty years before I had any more to do with dredges. Our company had the contract to design and build a sand processing plant. The customer was in a pickle when he discovered that the old wreck of a 14-inch dredge that they planned to use with the new plant was much too big and would flood the new plant with water. They asked us to give them a price for a new 8-inch dredge. We got the job, designed, built and delivered a new dredge and made a profit. The dredge performed and produced in excess of expectations. It was also surprisingly free of bugs. We promoted our new product and found that there was a market for our sand and gravel dredges. Sales followed to the extent that we turned almost exclusively to building and selling sand and gravel dredges.

The design of these dredges was my responsibility. Today I have answers to a lot of questions that were not being asked back when we were building the “naked dredge”. Every dredge project has brought new questions, opportunities and challenges. Structural and mechanical aspects must be addressed before we can build a sturdy, durable, productive machine. We have to select components that will give the best service at an affordable price.

Other, more subtle factors must be addressed. Does the operator have a good work environment? Do the instruments provide all the useful information reliable? Which digging device? Can the customer be convinced of the value of a performance-enhancing CONVAC modulating bypass valve? Are controls located so they are convenient to use?

Underwater pumps became available and we started building ladderpump dredges. At first, all the ladderpump dredges—the ones we built as well as those built by others—lacked a functional vacuum gauge! This was a terrible handicap because ladderpump dredges have the capacity to take in solids at a rate far in excess of their ability to pump them away. Firmly packed, plugged discharge lines were (and are) not uncommon when the operator has no indication of the rate at which solids were entering the pump. We experimented, tested, tried and tweaked many vacuum gauge arrangements over many years. We were successful.

The search for a ladderpump vacuum gauge was just one of many challenging problems that make dredging so interesting. We have identified and solved many other dredge-related problems and the search continues. Our goal is to help our customers make more money. We are a long way down the road from the naked dredge and ahead of a pack of competitors.

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