

Willard Says.....

Do You Really Need a Booster Pump

is the question that occurs when an ever-lengthening discharge pipeline starts to cause difficulties such as decreased production. Other symptoms could be pipeline plugging, increased rate of pump wear and high discharge pressure.

Sand and gravel dredge mining operations usually start with a fairly short discharge pipeline and proceed to mine away from the process plant adding lengths of pipe as they go. As pipeline length increases, pump speed and power input also have to increase to maintain velocity and density. At some point the maximum capability of the dredge system will be reached. Increasing the discharge pipeline length beyond that point has to result in reduced production. The question we are exploring in this paper is whether or not the dredge is being used to its maximum capability.

Make Your Dredge Be All It Can Be.

Do not assume that a booster pump is needed just because some of the production-robbing symptoms become more obvious as the pipeline length increases. It is prudent to make certain that a booster pump is really needed. It is not cheap to buy, install and maintain a booster so look before you leap.

Is the existing dredge system operating at full capacity? Can modifications be made to maintain or even increase productive capacity for less than the cost to install a booster system?

Consider the following questions and explore these factors which affect dredge production and performance. The answers may point to unused dredge capacity that could be utilized by making improvements that will extend discharge pipeline "range", increase production and perhaps postpone the need for a booster.

- Can the power unit turn the dredge pump at its maximum rated speed? It is surprising how many dredges have the wrong power unit-to-pump speed reduction ratio.
- Does the power unit have ample power to drive the dredge pump at its maximum rated speed while pumping a heavy load of solids? It is surprising how many dredges lack the power required to drive the dredge pump to its maximum rated capacity.

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- Is a vacuum gauge being used? It is *impossible* to operate a dredge to the limit of its capacity without using a vacuum gauge.
- Is a velocity meter being used? It is *impossible* to operate a dredge to the limit of its capacity without using a velocity meter. Gobs of power can be wasted if the pipeline velocity is faster than the target velocity—the velocity required to keep the solids moving in the pipeline. On the other hand, low velocity will result in piles of specification material not mined.
- Can the dredge operator maneuver the suction inlet as required to achieve and maintain the desired vacuum?
- Is the proper digging device being used to assure that an ample supply of pumpable solids is continuously available at the suction inlet?
- Does the digger have enough power? Is it running fast enough?
- Are the dredge positioning and hoist winches adequate? Are they the correct type and powerful enough? Are winch controls convenient to operate?
- Is the most effective dredging procedure being utilized?
- Is the dredge pump in good condition and properly adjusted?
- Does the discharge pipe have the right inside diameter? Double-check this item especially if HDPE plastic pipe is being used.
- Is production limited because the dredge is suction-side limited? Production cannot exceed the rate at which the pump can raise solids to its inlet.
- Is the dredge operator doing his job? Is he attentive? Does he know what he is doing? Is he comfortable? Is he well compensated? If the operator does not get it into the suction pipe, it is not going onto the pile.
- Is the dredge equipped with a CONVAC modulating bypass valve system? This suction bypass valve system eliminates interruptions caused by cave-ins and assures continuous production by enabling the operator to “dial in” and maintain the desired vacuum.

Other Options

There are several options to consider even after it has been determined that the dredge system is operating at its maximum capacity:

- Shorten the pipeline by going deeper and mining material previously passed over. This may require a longer ladder, a suction jet assist or an underwater pump.
- Install a larger dredge system.
- Move the processing plant closer to the dredge.

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