

# *Willard Says.....*

One of a series on the subject  
of practical hydraulic dredging.

## THE PACKING GLAND

**A. Packing gland housing.** The housing bore must be centered on (concentric with) the dredge pump shaft sleeve. It is very important to make sure that the gap between the shaft sleeve and the bore of the housing does not vary more than 10 thousandths of an inch (.010) in any direction. Rotate the pump shaft and take measurements to be sure that the shaft is not bent.

**B. Lantern ring.** This water distribution device fits into the packing housing bore and seats against the lip at the end of the housing bore. It should be centered under the ports (one or more) where service water enters the housing bore.

**C. Multiple rings of packing material.** The first ring seats against the lantern ring and all the rings are compressed into the packing gland bore by the packing follower.

**D. Packing follower.** This flanged, two-piece part fits around the shaft sleeve and projects into the packing gland bore. Adjusting bolts engage the flanges so force can be applied to compress the packing rings into the packing gland bore.

**NOTE!** It is very easy to over-tighten the packing follower and ruin new packing. If it is too tight the packing will get hot and smoke. Loosen immediately! If it is too loose it will leak a lot. Best to tighten the packing follower very lightly and adjust very gradually after the pump is running. Water should leak out of a dredge pump packing gland in a small steady stream. The packing should be adjusted to keep the stream diameter smaller than a lead pencil.

**E. Service water.** Clean water must be supplied to the dredge pump packing gland at a flow rate sufficient to create a pressure that is at least 10 psi greater than the dredge pump discharge pressure. Measure the service water pressure at a point near where the service water supply is piped into the packing gland water inlet port.

## *Willard Says.....The Packing Gland*

Service water injected into the dredge pump packing gland enables it to perform several functions:

1. Prevent air from entering the pump shell.
2. Prevent slurry from leaking out of the pump shell.
3. Cool the packing material.
4. Prevent packing and shaft sleeve damage by flushing solids particles away from the packing gland area.

Properly set up and adjusted, a packing gland will provide good service with only an occasional small packing adjustment. Many pumps run for thousands of hours before the packing needs replacement.

Very often the first symptom of dredge pump packing gland abuse (DPPGA) is the frequent need—perhaps every hour or even more often—to tighten the packing to prevent excess leakage.

Frequent tightening caused by DPPGA soon leads to the need to replace the packing. Many times dredgers take a shortcut and add just one new ring of packing at a time to save time and the cost of replacing a whole set of packing. As the problem persists, an alert dredge operator, while adding packing, may notice a groove has been worn in the shaft sleeve.

Now DPPGA is starting to really take a toll because considerable downtime, labor and expense will be required to replace the shaft sleeve and there are no other options.

Expectations are that packing problems will go away when the pump is reassembled with a new shaft sleeve combined with a new, miraculous and costly set of packing rings made of some exotic material.

It can only be hoped that the lantern ring has survived intact or been replaced and been installed correctly.

Frustration, gloom and despair will once more visit this dredge after it is put back in service unless the causes of DPPGA have been identified and eliminated. Despite all the effort and expense the packing problem will reassert itself and continue to cause a problem.

## **Causes of DPPGA**

Dredge Pump Packing Gland Abuse occurs when the dredge pump is subjected to any of these indignities:

- Frequent or continuous pump cavitation.
- Vibrations due to out-of-balance pump impeller.
- Bent dredge pump shaft.
- Pump shaft not centered in the packing gland bore.
- Groove worn in the shaft sleeve.
- Missing or damaged lantern ring.
- Pump base and shell not firmly bolted to a rigid common base.
- Lack of service water pressure.
- Dirty service water.

Correct these problems and packing gland troubles will go away.

## **Packing Material**

My observation is that the relatively inexpensive packing material such as is provided in a new dredge pump is quite satisfactory. It is a rope woven of cotton, flax or a synthetic fiber saturated with graphite grease or other slippery goo. Extra-expensive packing materials will not solve problems caused by DPPGA.

Preformed packing ring sets are available from some pump manufacturers and I recommend them.

A packing removal tool is very useful for reaching into the packing gland and pulling out old packing rings. I suggest a McMaster-Carr part #9492K15 flexible-shaft extractor.

## **Ladderpump Packing Glands**

Do not neglect to properly maintain the packing gland on a ladder mounted dredge pump. While there can be no problem of air entering the pump shell, the other functions of the packing gland are just as important on a ladderpump.

Contact [willard@willardsays.com](mailto:willard@willardsays.com) with questions, comment or criticism.