Updated Device Driver for DREDGEPACK® Crane Operations

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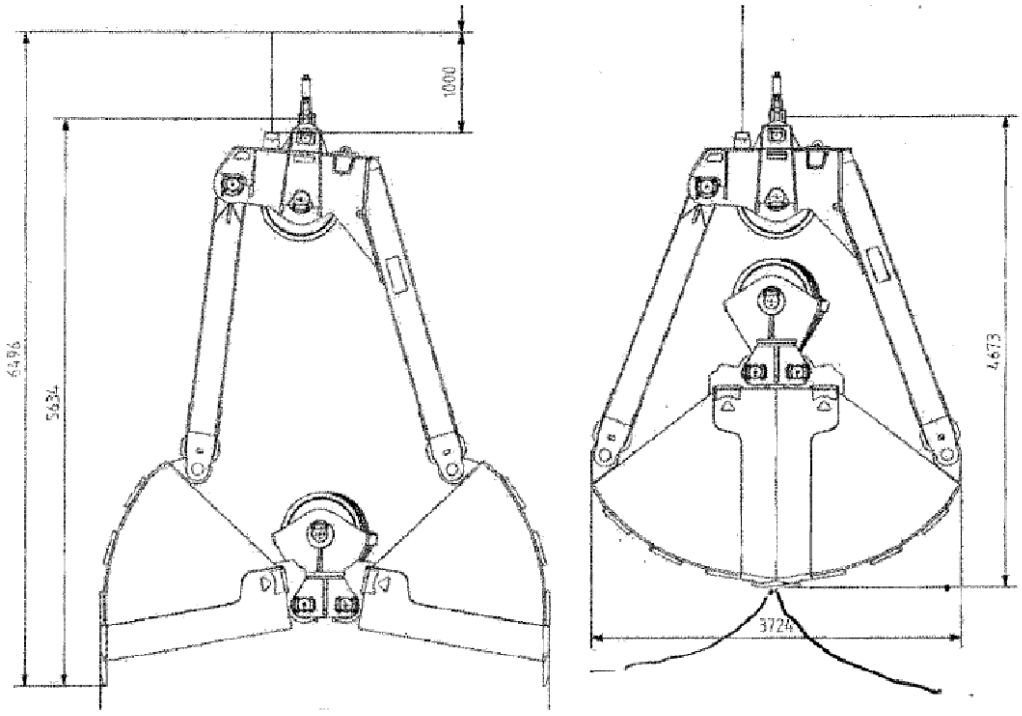
The DREDGEPACK® solution for cranes includes a crane control box that integrates readings from a boom inclinometer and a cable counter to produce depth values. We have been writing about this hardware configuration in the past. Recently, the system has been improved by adding a second cable counter for the closer cable.

For those not familiar with cranes, the majority of cranes have two cables: one (the 'holder' cable) raises and lowers the bucket while a second one (the 'closer' cable) opens and closes the bucket. When the cables travel at the same speed, the bucket maintains the same opening state. If the payout of the closer cable is more than the payout of the holder cable, the bucket is opening and if the payout of closer is less than the payout of the holder, the bucket is closing.

The latest version of the crane control box adds the hardware needed for this second cable and the firmware provides an opening percentage of the bucket. We have redesigned the driver for the crane system (CRANE.DLL) to take advantage of this new feature and provide a much nicer operator display and a more accurate matrix update.

One of the problems with bucket dredging is that they don't leave behind a flat bottom.

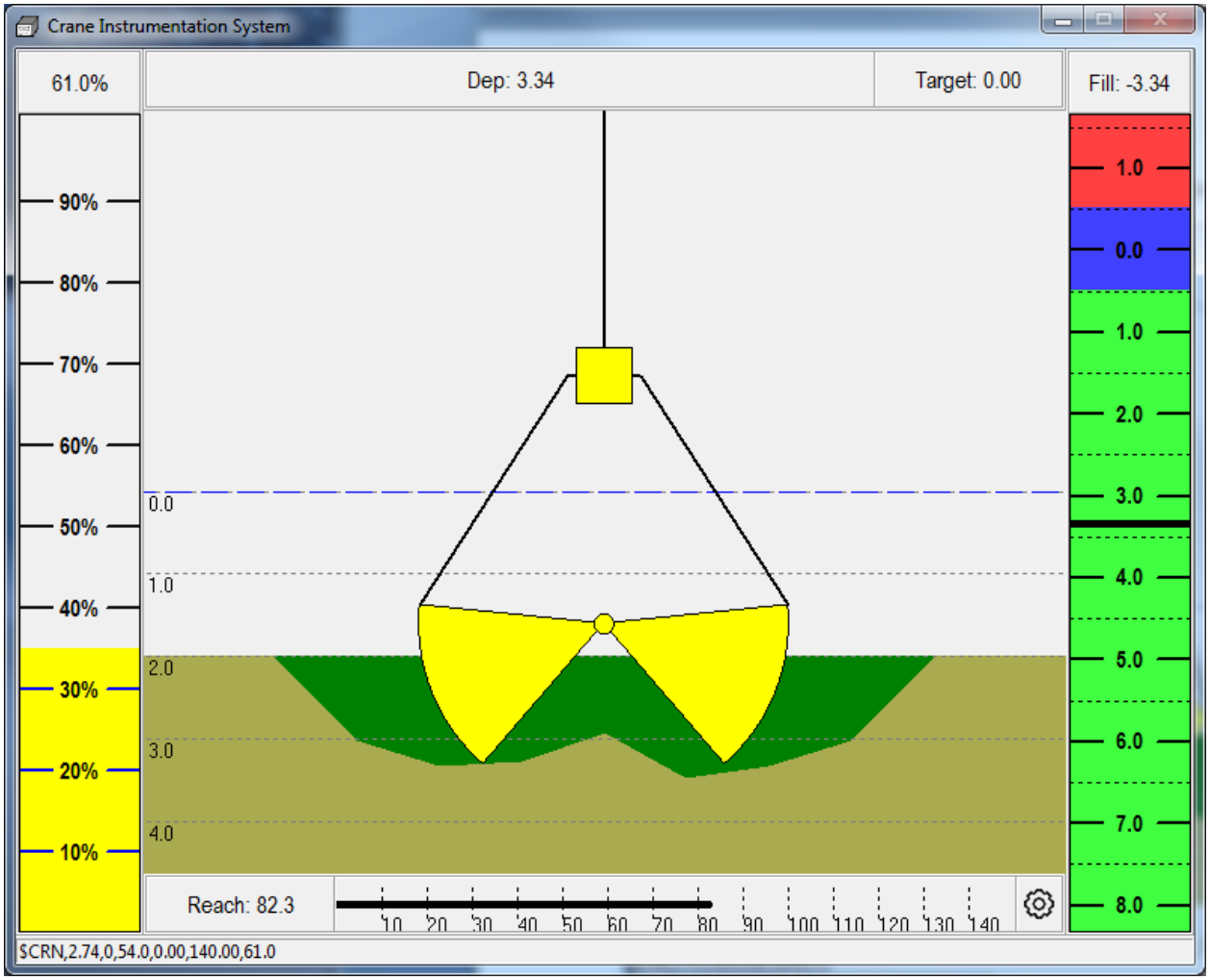
FIGURE 1. *Typical Bucket in Opened and Closed Positions*



For the bucket in Figure 1, there is almost 3 ft (1 meter) of difference between the opened and closed positions. If one wants to dredge close to grade, the operator has to skilfully lower the bucket as it closes to maintain the grade. This is very difficult to achieve without proper support from the dredge control software.

With this version of the driver, the operator is presented with a picture like the one shown in Figure 2.

FIGURE 2. *Device Driver Window*



The operator can see the bucket opening and closing action and can lower the bucket to eliminate the high spot in the center of the bucket.

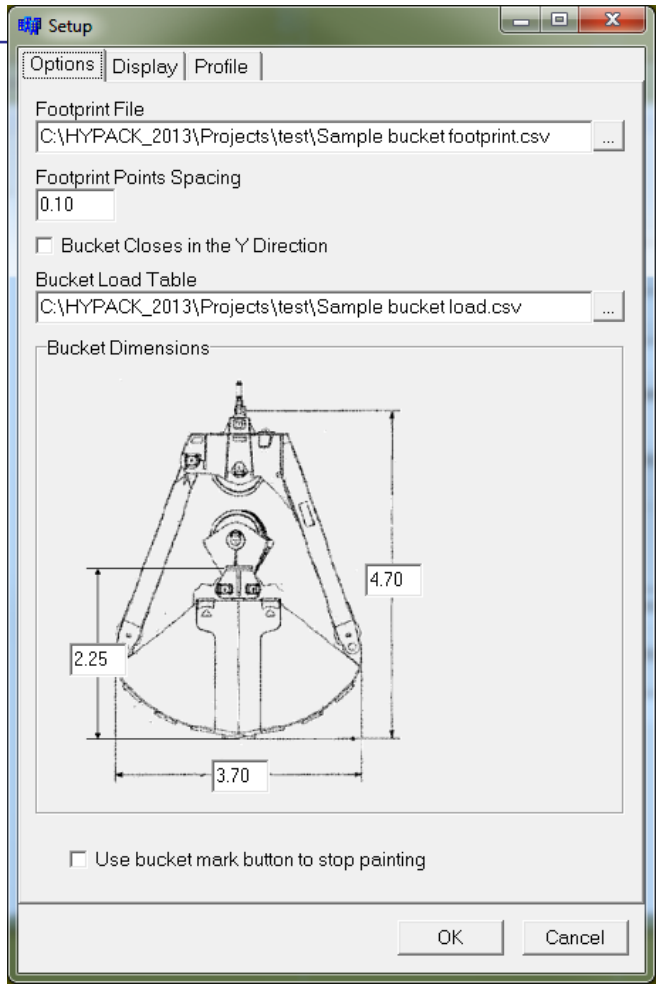
On the left, the window shows a load indicator showing the percentage of bucket capacity that is currently filled. This helps the operator avoid over-spilling of material when the bucket is lowered too much into the bottom.

The right-hand side shows a cut/fill indicator: the blue range corresponds to the required grade, red is shallower than grade and green is deeper than grade.

At the bottom of the window, there is a reach bar indicating the distance to the bucket from the boom trunnion.

The driver configuration is relatively simple. You have to provide two files. One of them, the footprint definition file, contains the X,Y,Z coordinates of a corner of the bucket for each percentage of bucket opening. The other one, the bucket load file, gives the volume of material in the bucket as a function of the bucket penetration.

FIGURE 3. Device Setup Window



In addition to these two files, you have to provide only the general dimensions of the bucket.

The new driver works with both the latest version of the Crane Control System and with the previous versions that were not equipped with a second cable counter. In this case, however, the bucket will always be displayed as closed.

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