

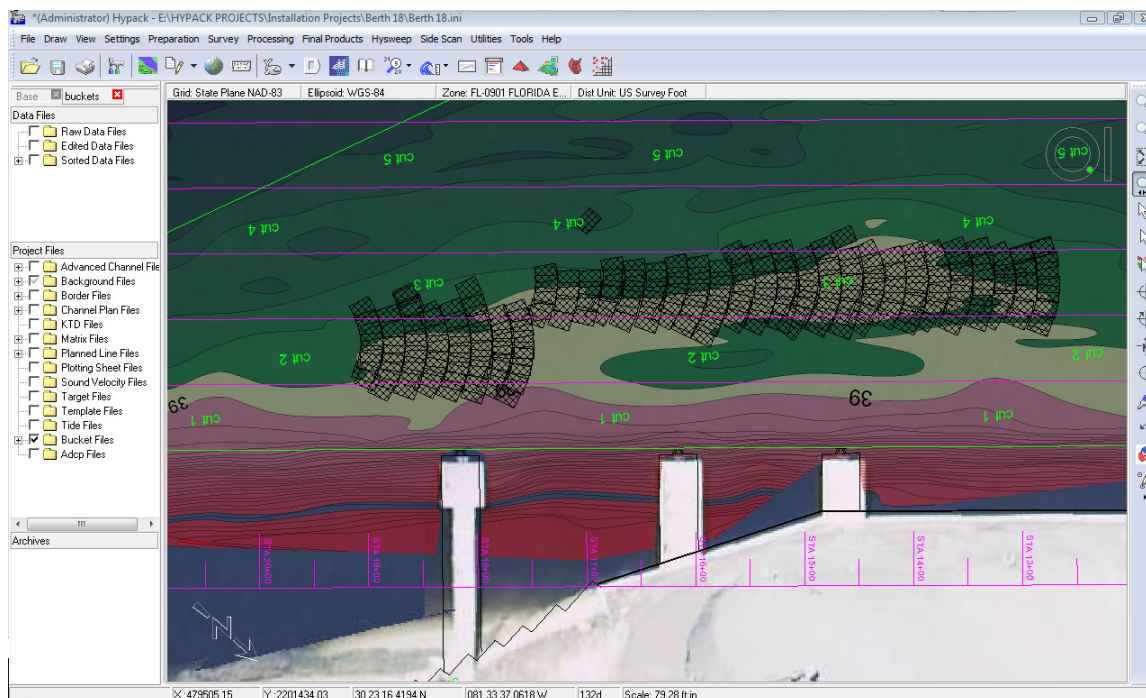


DREDGEPACK® Silent Inspector Report

Mechanical Dredging Specification

By Jerry Knisley

In early November a trip was made to the Manson Construction Dredge VASA to implement and test the Silent Inspector Mechanical Dredge Specification within DREDGEPACK®. Manson was gracious enough to allow access to the VASA during a project in Jacksonville, Florida.



The project above shows the buckets as they were removed from the cuts. The dredge started in Cut 3 and when the shoal was removed there, the dredge repositioned to Cut 2.

The Silent Inspector for Mechanical Dredges is an event-based reporting system. These events are triggered by the bucket closing in a dig cycle, the bucket opening in a dump cycle or 5 minutes of elapsed time if no other event has occurred. During this test, the system was never idle.

The equipment onboard the VASA includes a GPS with Heading for the crane position and rotation. The tip of the crane is also positioned using a GPS unit. As for the DIG/DUMP event the operator presses a button that marks the location of the current bucket. The HYPACK® driver for this is the BUCKET.DLL.

Part of this SI Specification that is different than the HOPPER Specification is that the DREDGEPACK® software is responsible for sending the data via email at an interval. In the previous specification, the SI system had an onboard computer that stored the data and then communicated with the SI main office. This method is a more streamlined approach with less hardware to maintain. On the other hand, it does require the contractor to have a reliable internet connection on the dredge computer.

As for the Bucket Driver I will go into a little detail.

FIGURE 1. *Bucket Driver Setup--
Bucket Info Tab*

The Bucket driver is used with a serial port to allow the operator to manually mark a bucket location from the seat of the machine by pressing a switch. This switch closes between pins 4 and 6 in the DB9 serial connector. The driver detects this action and marks a bucket in the software. During the test, we forced a DIG / DUMP cycle on the operator by not allowing any 2 dig events to occur without a dump separating them. The operator in this case used the F-11 and F-12 keys on the keyboard to mark the DIG and DUMP. The driver displays the time of the last button press. Also, I built in a delay so that no two presses can occur within 3 seconds of each other. I built in the delay because the operators sometimes hold the button until they see the mark appear on the screen.

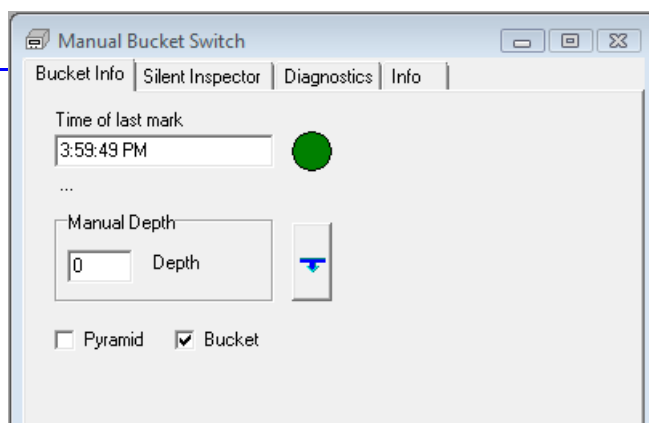
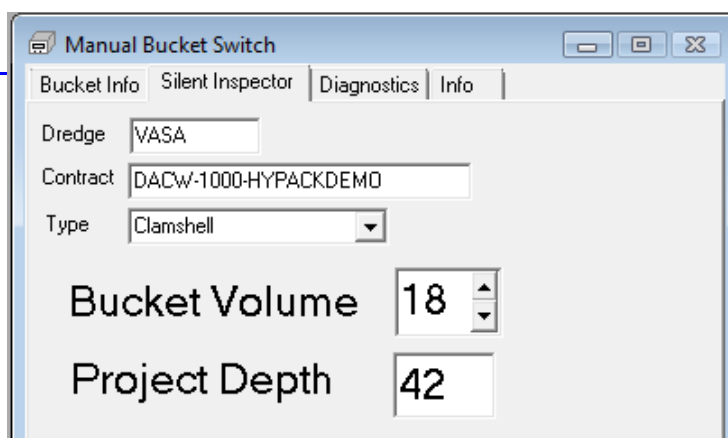


FIGURE 2. *Bucket Driver Setup--
Silent Inspector Tab*

Some of the information for the SI output is static. It does not change for the job unless the bucket is swapped out. That information is changed in the DREDGEPACK® program at the driver display. This is a screen capture of the driver from the SI test in Jacksonville.



The **Contract** entered is vital to providing data to the SI main office via email. This is used in the email program as the subject and will not be parsed properly if the contract is entered wrong.

The **Type** of dredge is standard and there are a couple of types that fall under the SI for Mechanical Dredges specification.

Bucket Volume and **Project Depth** will remain the same in most cases unless the operator changes the area or the bucket. On the job in Jacksonville, Manson has several buckets to choose from based upon the material being removed.

FIGURE 3. Bucket Driver Setup--Diagnostics Tab

The Diagnostic tab, specifically for the SI team, allows the system to be operationally checked without interfering with the dredge crew. By viewing this data, the SI team can see what the software is doing when a bucket is marked. All of the information is then transmitted into the HTML file that will be sent via email to the SI Main Office.

During this test, the clamshell dredge did not have a Z value. The VASA has the capability to incorporate a Z value, but at this time it was not operational to test. I hope to test this in the future on a clamshell dredge that has the Z component available, as well as on an excavator.

Manual Bucket Switch

Bucket Info | Silent Inspector | **Diagnostics** | Info

Dig Mark Time:

Dump Mark Time:

Key	Value
CONTRACT	DACW-1000-HYPACKDEMO
DATE / TIME	12/4/2008 16:09:41
BUCKET LAT	24.3205426451694
BUCKET LON	-82.970336948345
VERT CORRECTION	-2.5
BUCKET DEPTH	0
TARGET DEPTH	0
BUCKET STATUS	Dumping
BUCKET VOLUME	18
BUCKET TYPE	Clamshell
BUCKET HEADING	0

FIGURE 4. Sample Silent Inspector Report

DACW-1000-HYPACKDEMO

VASA

DATE_TIME	BUCKET_X	BUCKET_Y	VERT_CORRECTION	BUCKET_DEPTH	TARGET_DEPTH	BUCKET_STATUS	BUCKET_VOL	BUCKET_TYPE	BUCKET_HEADING
11/6/2008 11:52	30.38771048	-81.56121823	-2.5	0	0	42 Dig	18	Clamshell	315.7
11/6/2008 11:53	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	315.4
11/6/2008 11:54	30.8771	-81.56122396	-2.5	0	0	42 Dig	18	Clamshell	315.8
11/6/2008 11:56	30.38770475	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	316.1
11/6/2008 11:56	30.38770475	-81.56122396	-2.5	0	0	42 Dig	18	Clamshell	316.5
11/6/2008 11:57	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	316.6
11/6/2008 11:57	30.38770475	-81.56122396	-2.5	0	0	42 Dig	18	Clamshell	316.3
11/6/2008 11:57	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	317.3
11/6/2008 11:58	30.38770475	-81.56122396	-2.5	0	0	42 Dig	18	Clamshell	316.1
11/6/2008 11:59	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	316.4
11/6/2008 11:59	30.38770475	-81.56122396	-2.5	0	0	42 Dig	18	Clamshell	317.3
11/6/2008 12:00	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	316.8
11/6/2008 12:00	30.38770475	-81.56122396	-2.5	0	0	42 Dig	18	Clamshell	316
11/6/2008 12:01	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	316.7
11/6/2008 12:01	30.38771048	-81.56122969	-2.5	0	0	42 Dig	18	Clamshell	315.1
11/6/2008 12:03	30.38771048	-81.56122396	-2.5	0	0	42 Dump	18	Clamshell	316
11/6/2008 12:16	30.38784799	-81.56134428	-2.5	0	0	42 Dig	18	Clamshell	316.8
11/6/2008 12:17	30.38784799	-81.56134428	-2.5	0	0	42 Dump	18	Clamshell	316.9
11/6/2008 12:17	30.38784799	-81.56134428	-2.5	0	0	42 Dig	18	Clamshell	316.9
11/6/2008 12:18	30.38784799	-81.56134428	-2.5	0	0	42 Dump	18	Clamshell	317.1
11/6/2008 12:19	30.38784799	-81.56134428	-2.5	0	0	42 Dig	18	Clamshell	317.3
11/6/2008 12:19	30.38784799	-81.56134428	-2.5	0	0	42 Dump	18	Clamshell	316.3
11/6/2008 12:20	30.38784799	-81.56134428	-2.5	0	0	42 Dig	18	Clamshell	316.9
11/6/2008 12:20	30.38784799	-81.56134428	-2.5	0	0	42 Dump	18	Clamshell	316.2
11/6/2008 12:21	30.38784799	-81.56134428	-2.5	0	0	42 Dig	18	Clamshell	316.7
11/6/2008 12:21	30.38784799	-81.56134428	-2.5	0	0	42 Dump	18	Clamshell	316.4

To handle the email requirements a separate program was created that allows you to specify the recipients of the email as well as the mail server and the sender's email address. When I retrieve a copy of that program I will forward an addendum to this document.

The screen capture shown here is of the dredge as it was functionally operating.

FIGURE 5. Using Silent Inspector in DREDGEPACK®

