NEW CHIEFTAIN DOWN-PACKING PRESS OFFERS RELIABLE OPERATION & COST SAVINGS John G. Fiquett Cherokee Fabrication Co. Inc. Salem, AL

Abstract

The practicality of a down-packing presses verses up-packing presses for certain situations is obvious, first and foremost - there is no deep pit required. Installation of a pit can be a considerable investment, and if you have a high water table this can make it even more costly or prevent the pit installation altogether. Secondly most of the down-packing presses operations are above floor level which allow for it to be visibly monitored. With this in mind and wanting to have a down-packing press to offer to our customer's, Cherokee moved forward with the development of the Chieftain Down-Packing Press.

Our design goals for the development of the Chieftain Press was to have stable heavy duty structure that would endure the stresses of numerous tramping / pressing cycles, and offer a press that eliminated certain problem areas that were inherent to down-packing & up-packing presses. This of course would make its operation more reliable and cost effective for gins.

Our first 45 BPH Chieftain Down-Packing Press was installed at Greene Gin, Snow Hill, NC, in late August 2013, and started operation in late September 2013. The gin has 3 - 141 Double Eagle gin stands with split 96" cleaning, they average about 35 bales per hour, at times hitting 42 bales per hour. On November 19, 2013, they ginned 430 bales in an 11 hour shift, this averaged out around 39 bales per hour. They currently are manually tying the bales with wire ties.

They finished ginning on December 23rd, with 12,930 bales being ginned after shutting down the gin several times during the season because of running out of cotton.

A quick look at the press reveals that the Chieftain's overall structure is of heavy construction; both lower and upper sills are made of 4"thick plate, the end columns are 10"x 14" rectangle tubes with $\frac{1}{2}$ " walls, the center column is 10" square tubing with $\frac{1}{2}$ " wall thickness. The lower sill runs continuous - tying both end columns together making it very stable structurally. Both upper and lower sills are tied together with 6"diameter strain rods that are secured with heavy nuts on both ends. The boxes are designed to with stand the stresses required to generate UD bales as well as countless compression cycles thru-out the presses life. The final compression zone of the box is composed of a $\frac{1}{2}$ "plate skin reinforced with $\frac{1}{2}$ "plate ribs, and 3 heavy plate (2 – 2"thick and 1 – 3"thick) continuous rings, this provides ample containment of the forces required to make the bale.

Also extra venting is provided in the boxes to reduce blowout during tramping cycles, which helps with housekeeping around the press.

Contributing to the Chieftain's reliability and efficiency is that its tramper, pusher, and main hydraulic cylinders are all equipped and controlled with "LVDT" (Linear Variable Differential Transformers) sensors, eliminating the need for cumbersome proximity and limit switches which require adjusting periodically to maintain proper travel and positioning of cylinders. These cylinders equipped with the "LVDT" sensors are able to repeat their positioning to within a few thousandths of an inch. This allows for consistent movement of the cylinders during the various cycles of bale generation, and eliminates the wear and tear associated with banging hydraulic cylinders caused by proximity or limit switches getting out of adjustment. The Chieftain being equipped with this "LVDT" technology translates to a very smooth and reliable press operation.

Once the bale is formed (via the 16"bore double acting cylinder) the press box is pushed up from the bottom with 2 – hydraulic cylinders with 3"diameter rods, stripping it from the bale. This method of stripping or lifting the boxes was chosen for the Chieftain because of its reliability and durability. There are no cylinder catch brackets at the top of the boxes to lift them, these have been prone to cause problems and break off. It also eliminates the problem of breaking rods on the stripper cylinders or box lift cylinders mounted above the boxes (pulling on the top of the boxes) because of unequal loading applied while lifting the boxes. The bore of the Chieftain's box lift cylinders are such that they can allow for enough compression of the bale in the box and are still able to overcome the side friction loading and strip the box from the finished bale. Being able to have adequate compression within the box or

having a high enough extrude pressure before lifting the box is necessary to produce a nice shaped squared bale that lends itself well to stacking, and the design of the Chieftain enables this to happen.

The Chieftain has a pneumatically powered bale receiver lowering arm that also doubles as a mount for the strapping return chutes; this mechanism lowers the bale onto a chain conveyor which in turn moves the strapped bale on to the bagger. This lowering arm and conveyor system eliminates the need for a bale dolly, so there is a reduction in cycle time - not having to wait on a dolly to move in and out of the bale strapping area. The elimination of the dolly not only reduces the overall cycle time of the press, but also results in cost savings up front with the initial investment and in the maintenance associated with bale dollies.

Hydraulic power for the belt feed, pusher, tramper, and press is supplied by a single reservoir power unit with all pumps being skid mounted. Total horsepower for the 45BPH hydraulic power unit including the air to oil cooler is 232.5 HP. The hydraulic power unit's modular design and extra porting of the reservoir allow for additional pump motor groups to be added, very easily bringing the presses capacity to 60BPH.

So with the addition of a 5 HP power-turn motor, this brings the total connected horsepower requirement for the Chieftain Press to 237.5 HP. This makes the Chieftain very cost effective to operate in the long run when compared with older designs (both up-packing & down-packing presses) that required more horsepower / energy to deliver 45 BPH.

An intuitive touch screen controller is provided with the Chieftain Press providing an operator interface that's very user friendly, and easy to troubleshoot problems that may occur during operation. There is a screen page in addition to the main operator screen that displays all the switches on the press indicating their state (whether certain switches are made or not), and a set up page that allows the operator to change select operational features.

Even the press service platform which gives service access to components (belt feeder, pusher & tramper) above gin floor level is supported by heavy structural steel members that provide further structural stability to the press. The front center section of this service platform / support structure is engineered to allow it to be removed so as to gain close access to the front of the press with lifting equipment for servicing the press (i.e. - main cylinder & tramper cylinder removal / servicing). This feature contributes to the Chieftain's ease of maintenance, translating to cost savings when it comes time to service the press.

As you can see the design of Cherokee's new Chieftain Down-Packing Press offers durability, serviceability, and ease of operation all of which speak to its reliability and savings in cost to be realized over the life of this press.