COTTON WAREHOUSE FLOW SURVEY - EXECUTIVE SUMMARY

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Abstract

The purpose of the cotton warehouse flow survey is to provide the cotton industry with a snapshot of the current state of baled cotton warehousing in the US. In order to accomplish the purpose, the National Cotton Council (NCC) staff laid out objectives to make sure the survey contained questions that focused on both bale and data management practices. Further, survey participants were asked to provide information relating to their current bale and data handling practices. All surveys were conducted through personal interviews, directly or by phone, that ranged from an hour and fifteen minutes to three hours in length.

Warehouse Infrastructure

Three distinct types of warehousing operations are included among survey participants. "Country warehouses" include facilities that only receive bales directly from gins. "Country/hybrid warehouses" include facilities that receive most of their bales from gins but do receive some bales from other warehouses. "Distribution center/consolidation warehouses" include facilities that may receive some bales directly from gins, but most of their bales come from other warehouses. In most cases, inbound cotton bales are on their way to a port, intermodal point, or mill and are usually handled in blocks/container loads.

Survey results are based on the NCC staff's personal interviews with warehousemen. Even when a warehouseman was responsible for a number of warehouses, the interviewees were asked to limit their responses to a single warehouse code operating at a single location. In several cases, more than one warehouseman, in the same company, were included in the survey to determine if warehouse practices varied within that company. By encouraging interviewees to base their answers on single locations, the NCC staff believes that the answers to survey questions include most commonly-used warehouse practices. By design, several questions were open-ended and as a result, warehousemen were able to share their thoughts about a particular process or procedure. These thoughts were insightful, particularly in explaining why certain practices were employed and which new ones are being considered.

Distance "To" and "From" Warehouses

The "to" category for some country warehouses includes warehouses on or adjacent to cotton gin properties. Where warehouses are on the same property with the gin, the distance from the gin's bale press to the put-away area at the most remote cotton storage building is less than one-thousand feet. Other country warehouses indicated that the gins sending cotton bales to them are usually within a few miles of the warehouse. All country warehouses surveyed had at least one gin customer within 60 miles of their warehouse.

Excluding the country warehouses that only receive cotton from a single gin, approximately ten percent of the country warehouses serve gins within six to ten miles of their facility. The rest of the country warehouses serve gins within an hour's drive of their facility. In some regions, it is common for there to be distances of several hundred miles from the gin to a warehouse. Distances to country/hybrid warehouses were similar to the distances to country warehouses. With the consolidation of gins and warehouses, these distances are expanding.

The "from" distances include distances from country and country/hybrid warehouses to distribution center warehouses and other entities such as certification points. One survey participant stated that Memphis and Dallas/Fort Worth are considered to be cotton ports because of the intermodal hubs at those locations. Other warehousemen concur with that assessment.

Use of Available Storage Space and Building Longevity

The use of available storage space varied, based on the size of the 2008 crop. Generally, all areas of the cottonbelt had smaller than average crops that year and as a result, many warehouses had surplus storage space. When confronted with the issue of surplus storage space, survey participants indicated that they employed the following

strategies: (1) leave some buildings empty while concentrating cotton in fewer storage units, (2) where possible, use empty buildings to store other commodities, (3) modify their bale storage pattern to take advantage of the additional available space and/or (4) test new stacking patterns.

Roughly half of the cotton storage buildings in current use are between fifteen and fifty years of age. Approximately a quarter of the surveyed warehouses use storage buildings, whose average age is greater than fifty years, and in that category some warehousers often use cotton warehouse buildings built prior to 1940. Another quarter of the warehouses use cotton storage buildings that on average are less than fifteen years old.

Bale Handling Capabilities

Procedures
All warehouses indicated that their bales undergo some type of inspection following receiving and before the bales are stored (put-away). Inspections are usually performed by trained unloading personnel (forklift drivers) or designated individuals. A few warehouses indicated that multiple bale inspections are performed and that those inspections involve several persons. Grading outbound bales using the Joint Cotton Industry Bale Packaging Committee's (JCIBPC) "A Guide for Cotton Bale Standards" is a common practice. Inspections of inbound bales reveal that round or sloping bale heads is the most common condition that causes warehouse problems with stacking during storing and loading. Most warehousemen indicated that their bale stacking issues were usually linked to specific gins and those gins' bale presses.

Conveyances
Country and country/hybrid warehouses in the Mid-South and Southeast may receive and put-away bales straight from gins by lift truck, but substitute vans for lift trucks if gins are more than several hundred feet from the warehouses. Country and country/hybrid warehouses in the Southwest and West receive bales in vans or on flatbeds.

Consolidation warehouses almost always receive cotton in vans or containers; but at those warehouses, most export bound bales are loaded in containers before leaving the warehouse. Management at consolidation warehouses indicate that when vans are unloaded, the integrity of most loads is preserved so that the same bales that came in on a van will be stuffed in a container before they leave the plant. It was highlighted during the survey that it is often cheaper to pay a truck/van for a one way haul to the port warehouse, compared to paying a trucker to drive a container to and from an interior warehouse.

While many cotton warehouses were originally established at locations where railroads provided service, very little cotton has been shipped by rail from country and country/hybrid warehouses in recent years. About seventy percent of the warehouses indicate that they do not have rail facilities. However, distribution and consolidation centers linked to the intermodal rail service are important for container shipments, particularly for cotton moving through Memphis and Dallas/Fort Worth.

Weighing and Sampling
The practice of receipting bales based on gin weights has streamlined receiving at most country and country/hybrid warehouses. Some weighing still takes place at receiving; (1) if a gin does not have certified scales or (2) to confirm gin weights. Spot checking of gin weights typically occurs at portable scales, shortly after the bales are unloaded. All bales are required to be re-weighed during the certification process and new samples must be pulled, classed and racked.

At most country and country/hybrid warehouses, the gins cut the USDA AMS samples at the bale press and send the classing sample directly to AMS by truck. Less than ten percent of the country and country/hybrid warehouses still cut and send original samples to AMS. Most warehouses indicate that they no longer rack or bag buyer's samples.

Most outbound cotton is not re-weighed prior to load out even though one merchandising warehouse indicated their practice is to re-weigh all bales. All survey participants indicate that requests for re-samples are rare.

Naked Bales
Applying the bale bagging at the warehouse is common practice in one pocket of the Cotton Belt. At those locations, high speed bagging lines process the cotton as it is received from the gins. The country warehouses that apply

bagging indicate that their throughput was between three-hundred and five-hundred bales per hour. These warehouses account for most of the entities that cut and forward samples to AMS at the warehouse level.

Put-Away/Bale Stacking
A range of put-away practices were identified. The most straightforward process involves moving bales from a gin's bale press directly to put-away by a lift truck fitted with a bale clamp. This process only occurs at country warehouses that are adjacent to gins. If this process is used, typically four bales at a time are moved from the bale press and the number of bales put-away per hour is governed by gin throughput. At most warehouses put-away is typically directly proportional to bales unloaded per truck per hour.

The survey identified four stacking methods:
1. ROW (Figure 1: Bale heads up; no rows more than two bales wide; aisle between each row)
2. BLOCK (Figure 2: Bale heads up; 3 or more bales wide; 3 or more bales deep; aisle between rows of various widths)
3. CORD WOOD (Figure 3: Round side of bales (crown) or flat up; arranged in rows or blocks; aisle between rows of various widths)
4. RACK (Bales stored in racks)

Selected Warehouse Stacking Patterns

Figure 1: Row (Head on Head)

Figure 2: Cord Wood (Side on Side)

Figure 3: Block (Head on Head)

Row stacking is the leading method in the Southwest and West, while block stacking is the leading method in the Mid-South and Southeast. Block stacked cotton's main advantage over other stacking patterns is attributed to the square feet of floor space needed to store a bale of cotton. Where row stacks normally require between four to five square feet per bale (similar numbers for cordwood), block stacks need only three to three and a half square feet per bale stored. It is significant that some country/hybrid warehouses store gin cotton in rows but store cotton from other warehouses in pre-sorted container size blocks for quick shipment.

Bale "Touches"
A distinguishing difference between row stacked bales and block stacked bales is the number of times a bale may be "touched" or handled with a lift truck or other machine from the time bales are received until they are loaded for shipment. The best case scenario for both storage methods is a minimum of two touches and those two touches are only possible when the first bales to be shipped are on the front face of a block.

For row stacked cotton, the average number of touches was five and the maximum was ten touches. In cases where touches were more than five for row stacked cotton, it was because the common practice was to consolidate rows several times per year. If rows are not re-stacked, then row stack warehouses report that their minimum, average and maximum "number of touches" are always similar.

Block (and cordwood) stacked cotton presents a greater challenge in terms of minimizing bale handling. Some warehouses that block stack, report that they may touch individual bales forty to sixty times before bales ship. There were other block stack warehouses that declined to estimate the maximum number of touches. Some block stack warehouses indicated that they are able to minimize the number of touches needed to break out cotton by reducing the size of their blocks.

Several individual practices showed great efficiencies using the block stacking method when paired with other practices. For example, one warehouse was able to minimize the number of touches in the warehouse by storing bales in 88 bale lots or the number of bales typically shipped in a van or container. The practice at this gin/warehouse is to group each grower's modules prior to ginning so that a grower's bales can be stored after ginning in running lots of 88 bales. The merchant/ginner/warehouser then assists his growers with the merchandizing of their cotton blocks and makes sure that all sales were in 88 bale units. Another exception to the block stack multiple "touch" issue was at a distribution center warehouse that received only van or container loads of cotton. At that warehouse, vans were often trans-loaded, and then shipped within a short period of time and container loads of cotton were held for later shipment. Another successful effort where warehouseman and shipper cooperation resulted in the reduction of the number of touches involved the rigorous use of location codes to arrange and then pull bales on shipping orders from a limited number of blocks in the warehouse.

Data Handling Capabilities

Warehouse Management System (WMS)
Most warehouse practices that involve a bale of cotton have a corresponding practice involving individual bale data. The survey questions in these sections deal with warehouse office support systems often referred to as WMS. Included are questions about software use and sharing capabilities as well as how warehouses manage their core business processes, i.e., receiving, put-away, manifesting (picking), shipping, scheduling, etc. The questions address basic communication with the electronic provider system, the software used to generate electronic warehouse receipts, and the software used to manage daily warehouse activities.

As anticipated, all of the warehouses surveyed use a range of software products. The primary sources of software are; eCotton Warehouse System® software, proprietary software that is designed and maintained by warehouse staff members or other warehouse associates, and other commercially available third party warehouse software packages.

All surveyed warehouses indicated that they were using some type of software program to help manage their core business processes. Some warehouses are highly automated, while other warehouses have found ways to incorporate new technology while still depending on a degree of worker competence to maintain productivity and increase efficiencies. Some warehouses indicated that their software also handles their gin customers' computer and electronic communication needs.

Communications Capabilities
The survey includes questions that reveal how warehouses use software as part of their WMS and how data from internal and external sources is managed. The questions about electronic data sharing capabilities with others elicited a range of responses. For example, most warehouses indicate that they currently share information in an electronic format to and from gins. Most of this sharing takes place via the internet, but in cases where the gin and warehouse operate as a unit, bale data and other information is typically shared without the need of the internet. In most of those cases, the warehouse uses a software program like eWarehouse® and the gin uses eGin®.

When asked about data sharing practices with other warehouses, most warehouses stated that even though this sharing capability exists, their preference is to minimize those types of communication. It is usually left up to the shippers to supply bale data when bales are consolidated. Some of the country/hybrid warehouses indicate that inter-warehouse data sharing would be beneficial, but they are currently relying on telephones and faxes to plan activities around inbound loads from other warehouses. Most warehouses indicate that there is active sharing of information to and from shippers.

Virtually all surveyed warehouses indicate that they share information with USDA electronically. This is in part because USDA cotton storage agreement policy requires certain information to be shared electronically.

The next questions address how intra-warehouse communication is facilitated, with an emphasis on how bale records are built, recorded, and maintained. Most country and country/hybrid warehouses scan PBI bar code bale tags when bales are received or during bale put-away. After receiving or put-away, the barcode scanners are periodically docked and the scanned PBI numbers are dumped into their system using a hard wired connection. A few warehouses rely on radio frequency communication to gather and transmit the PBI data to the warehouse office.

For gin/warehouse combinations, the first record is often built at the bale press then seamlessly transferred from the gin system to the warehouse's system. In some cases, record building by PBI bale number is a manual process.

A majority of the warehouses indicate that electronic bale records are normally (but not always) received from gins at some point after bales are received. Few of the warehouses surveyed receive grade/class information. One anomaly is a naked bale warehouse that generates bale records internally after receiving the bale and then sends bale records to gins. Survey responses were split between warehouses that believe they need grade and class information to take care of growers' needs and warehouses that are not concerned with grade/class data.

Electronic Warehouse Receipt Process
Two-thirds of the warehouses indicate that PBI tag numbers and receipt numbers always match. More than a third of the warehouses issue receipts as soon as bales are unloaded, received and put-away. A majority of the receipts are issued within twenty-four hours of receiving. When bales take more than a day to be receipted, warehouses indicated that the primary reason was because of a delay in receiving information from gins.

When asked to name the "deposition holder" when an electronic warehouse receipt is issued, the warehouses indicated that a majority of the time, the gin is the grower's deposition holder. The next deposition holder group is the warehouse (who is usually waiting on instructions from the grower), third is a cotton marketing association, fourth is a FOB (commission) merchant, fifth is a merchant and last the grower.

Intra-Warehouse Information Accumulation and Sharing
The next set of questions asked, "How does the office know what takes place in the plant and visa versa?"

As previously indicated warehouses usually indicate that it is their practice to rely on (electronic) information from the warehouse floor to identify where bales are put-away. The second most common practice is for the plant manager to send put-away information to the receiving area so that the crew in the warehouse (and the front office) knows where bales are to be put-away. Another practice is to manually receive put-away information from the crew in the warehouse following put-away and the least used practice is based on the office sending put-away information to the warehouse. At least one warehouse indicated that prior to the start of ginning; they sit down with their growers and determine who has bought the growers' cotton. Once the cotton buyers are known when the growers' cotton is ginned, the bales are sorted and grouped in the warehouse by buyer.

The locator ID field on warehouse receipts is typically based on the scanning of the PBI number as a bale is put-away, the scanning of a PBI number after a bale is put-away, or a lift truck operator's hand written location report. When asked about tracking bale locations in the warehouse following put-away, over two-thirds of the survey participants indicate that they maintain an individual bale location in their WMS while less than two-thirds maintain "bale block" locations. Most warehouses indicate that the eight character location code is updated on the provider system if bales are re-located in a warehouse any time during the year.

Most row stack warehouses believe that they do not need bale block locations. Some block stack warehouses identify a bale as part of a block and also track the location of a bale in a block. Because some country/hybrid warehouse store bales in both rows and blocks, those warehouses tend to rely on a dual bale location monitoring system. Country/hybrid warehouses may use individual bale locations when tracking bales coming from gins (store those bales in rows); but may use bale block locations for shipments from other warehouses (store those bales in blocks) because the inbound bales are pre-sorted and maintain a unit identity that allows the bales to be worked as a container or van load.

Shipment Scheduling and Related Activities
The shipment scheduling process typically begins with electronic batch type files received via the electronic receipt provider. Most warehousemen indicate that scheduling starts when "shipping order instructions & receipts (SO)" (EWR, Inc. Batch 21 type) communications are received through the provider system. That means that the shipper usually returns electronic warehouse receipts, but it is often the case that shipping dates must be confirmed before pulling starts at the warehouse.

In the above cases, shipment schedules are based on any one or a combination of the following: emails, facsimile transmissions or phone calls. For example, if a warehouse has a calendar on the internet, the scheduling process

usually begins when a merchant selects an available date on the warehouse's calendar. Other observations from survey participants include: "we use the date on EWR, Inc. Batch 21 file as the (ship) date with no follow-up…" or "(we) only receive dates in the EWR, Inc. Batch 21 about 50% of the time, (therefore) scheduling (of the) remaining (50% is) by fax and a fax confirmation is required."

Most warehouses always allow an "early shipping order (ESO)" (EWR, Inc. Batch 31 type) files, but a few warehouses do not allow an ESO under any circumstance. It should be noted that some warehouses that never use an ESO have an internal system that allows them to work a quasi ESO. Regarding access to the provider system, the comment was made that when it comes to scheduling "…smaller shippers who rely on freight forwarders are at an electronic disadvantage because freight forwarders do not have access to the EWR (Inc.) system." The following comment applies to all surveyed warehouses: "even if the SO is ready and equipment is at warehouse, loads are never released (unless) electronic receipts (are in our possession)."

At this time, none of the surveyed warehouses are using the "Update Shipping Order" (EWR Batch 23 type) file to accept requested shipping dates or offer alternative dates. Apparently both groups, merchants and warehouses, are waiting for the other group to go first.

When it is time to cancel receipts following shipment, most warehouses use EWR, Inc. Batch 11 files which cancel receipts by SO numbers. The remaining warehouses use EWR, Inc. Batch 07 files which cancel receipts by receipt numbers. The other batch type files commonly used by warehouses are ones that allow the warehouse to update "Locator ID" fields or "warehouse bale relocation" batch types.

Getting Work Orders (Manifests/Pick Lists) to Machine Operators
Most warehouses indicate that they almost always generate and release to their machine operators the manifests/pick lists consisting of multiple shipping orders. However, a significant number of warehouses indicate that they never use this approach. Instead the second group chooses to generate and release manifests/pick lists consisting of single shipping orders. While there is some overlap between these two approaches, in general, warehouses that block stack cotton tend to favor releasing multiple SOs on a manifest to a machine operator whenever possible, while warehouses that stack cotton in rows tend to release a single SO to a machine operator.

As one block stacking warehouse stated, "I had to learn how to use multiple shipping orders to cut down on the number of times a block was disturbed." Several survey participants indicate that for export-bound shipments, they found it necessary to release work orders by destination.

Based on the responses to the previous question, it is not surprising that most machine operators are only given a paper document containing PBI bale numbers and locations of bales in a building or group of buildings. However, some machine operators are given preloaded bar code readers that allow the operator to check off the bales as they are located and pulled. At other row stack warehouses, "flaggers" locate bales on manifests and machine operators pull bales based on color coded flags.

Once bales are pulled and staged for shipping, warehousemen agree that it was up to the shipper to get load information to truckers. Some warehouses state that they use EWR, Inc.'s "Is My Load Ready" tool to communicate with trucking companies, but the tool is seldom used by shippers or truckers. Some warehouses with calendars have public areas available on their web sites that allow freight forwarders and truckers access to their loads, provided the freight forwarder or trucker has specific load information.

Shipping Dates
Questions in this section dealt only with the 2008 crop year. Warehouses indicated that they were able to schedule shipments on the shippers requested date ninety-eight to one hundred percent of the time. The rest of the time, the first available date is used and in some cases, warehouses offer shippers ready dates prior to the first available date. When asked a question about "days out" for 2008 – 2009, several warehouse reported that at one point they were about three weeks out. The average for all warehouses was less than a week. We recorded several comments like this: "We have had several days in a row booked solid weeks out, but (can make) open space available prior to those dates."

Disclaimer

The inclusion of specific warehouses among survey participants is not intended to produce a representative sample, but it is intended to identify major warehousing practices. It was not known until the survey was begun that several survey participants recently altered previously used practices. To make sure those previously used practices are included in survey results, staff added survey participants when necessary. Therefore, even though the survey contains responses from 34 warehouses with a combined licensed capacity of 3.4 million bales, one should not assume that the survey results are a representative sample of all US cotton warehouses.

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