

Zeke McSherry (ASM) and Jarvis Cale (ASM)

Overview

Nearly all commercial farming relies on crop yield monitoring to make informed decisions including seed selection, fertilizer assessments, lime requirements and others. Baled crops are one facet of agriculture that currently lack a viable means to achieve yield monitoring data. As a result, forage farmers are unable to benefit from the educated decisions that can be deduced with yield data. The Bale Weighing system has the potential to fill this void with the use of bale forks implemented with a digital scale operating in conjunction with GPS tracking to monitor both bale weight and bale location in the field. If these processes can be brought together into one computer program, forage farmers will have the ability to make educated decisions based on the yield of the particular crop they are harvesting.



Alternative Solutions

Baler Sensor

- One alternate solution would use a sensor in the bale chamber of the baler. It would allow for constant measurements to be made any time in the baling process.
- This would provide an opportunity to be extremely detailed with yield mapping.

Pull Behind Trailer

- A pull behind trailer could be added to the back of a baler and be outfitted with load cells to weigh each bale.

The bale fork design ultimately chosen was a result of several factors. The bale forks were already outfitted with load cells as well as an inclinometer that made it the most cost effective solution. The bale forks were also rigged with an inclinometer to ensure accurate weight even when on uneven ground. Finally, the technology on the bale forks is very adaptable and can be used in a variety of situations.

Objective

To take a bale weighing system that was developed in previous years and improve its capabilities to allow both bale weight and GPS field data to be gathered and stored on a computer. Data information will be uploaded into Microsoft Excel in conjunction with a GPS tracking system to provide a simple, easy to use, accurate tool to make field management decisions based on bale tracking data.



Project Goals

- Outfit the current bale forks with GPS to monitor field path and location.
- Combine all the weight and GPS data together on a Mobile Demand Tough Tablet
- Provide the ability to move equipment from one tractor to another quickly and efficiently
- Construct a clearly defined user's manual eliminating the need to learn each program and process individually.



Components and Cost

Item	Cost
Load Cell Bracket	\$276.00
Data Logging Software	\$585.00
Sandblasting and Painting	\$30.00
Three-Point Hitch Bale Forks	\$825.00
Steel and Material for Mounting Brackets	\$54.00
Level Indicator System	\$1,200.00
Machine Shop Service	\$40.00
DigiStar Transfer Utility Software	\$43.00
DigiStar Patch Cable	\$89.00
XT726M2E-0000 T7200	\$1,865.00
BAT-HC-T72 T7200 Hi-Cap Battery 2	\$250.00
ACC-US AC Adapter with Power Cord	\$0.00
DRV-MSATA-128 128 GB Drive	\$295.00
000-802 X Protect Warranty	\$318.60
XMT-VMT-20 Vehicle Cradle	\$475.00
WIRE-KIT10 VMT10-Vehicle Wiring Kit Assembly	\$140.00
VMTMNT-D D Ball for Vehicle Cradle	\$25.00
RAM-D-235U UNPK RAM	\$40.00
RAM-D-201U RAM	\$70.00
500-107 Auto Adapter	\$55.00
QWERTY-T7-01 QWERTY Keyboard	\$395.00
XOD-T72-1 T7200 Office Dock	\$275.00
OD-LATCH-EXT Office Dock Latch	\$33.00
4100642 GPS 1600	\$995.00
Discount Precision Ag Discount	(\$211.83)
Shipping	\$50.00
Total:	\$8,211.77

Research

In order to understand the task at hand and accomplish it effectively, it was first necessary to understand a few things about baling in general.

- Baling is often done in a pattern unlike how it is mowed. This makes it vital to have the capability to get GPS data from the baler itself in order to get accurate information as to where the forage being baled came from.
- Baling is often done on uneven ground making the ability to level and monitor loads for accurate weight important to the process.
- Farmers generally do not wish to add steps to the baling process making ease and simplicity imperative.



Conclusion

The Bale Weighing System has been upgraded to allow both GPS data and bale weight information to be uploaded to Excel for analysis. The improved system requires only the push of two buttons in order to capture information making the process efficient.