

Status Report: On Board Module Picker Systems

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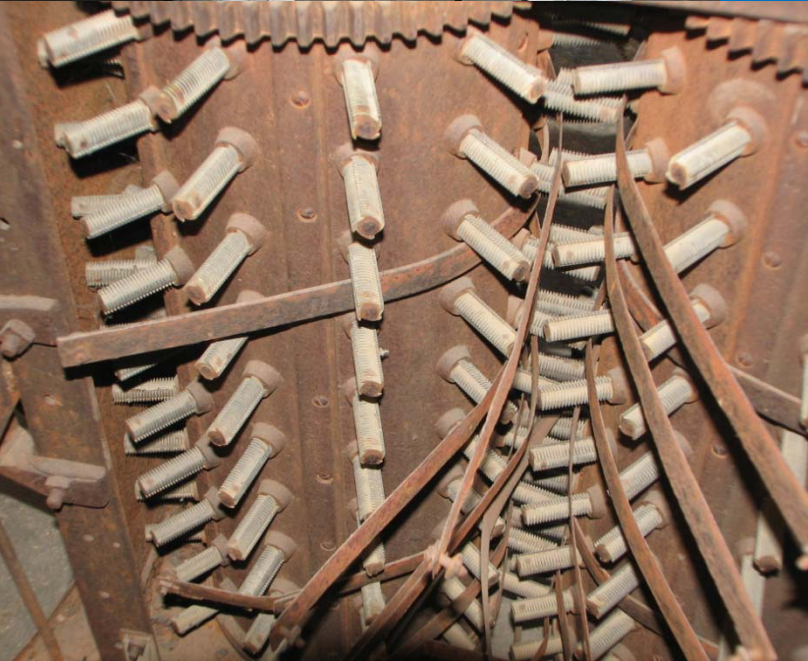
MSU ES Ag Engineering

12/ 12/07

Since the First Cotton Picker Demonstrations:

New pickers create great excitement and anticipation
Handling seed cotton away from the picker has been a hassle

1912 Pruser mule drawn picker



1936 Rust Picker, Stoneville, MS



Objective: Provide a status report of the Cotton Incorporated sponsored Innovative Harvest Systems Project

- Discuss factors involved in making an analysis of the old and new systems
- Discuss fuel consumption for the systems
- Discuss time-in-motion data collected and how it will be used



Overall Goal:

Develop a computer model of a season long, farm scale harvesting system that will use harvest system performance, GIS maps, historic yields, weather and price variables to simulate picking time, cost and revenue.



Conventional System







KBH

Creek Gin Mill
2006
9007
Creek Gin Mill

Creek Gin Mill
2006
9007
Creek Gin Mill

Creek Gin Mill
2006
9007
Creek Gin Mill

Creek Gin Mill
2006
9007
Creek Gin Mill

Creek Gin Mill

Conventional System

- 6 Row Picker, Boll Buggy, Module Builder, 2 Tractors
- 1 Picker driver, 1 boll buggy driver, 1 module builder operator, 1 or 2 turn row laborers
- Tarps (Cycled 3 times/season for 3 seasons)
- Pickers typically operate 70% of time on the row, but varies by field size and management style



Case NH 625 Module Express

- Picker: ~ \$450,000 list price
- Weight: 55,000 lb shipping, 65,000 lb loaded
- Module size: 8,000-10,000 lb
- No intermediate transport device
 - picker must serve this purpose when needed
 - module size may be dictated by field row length
- Tarps: slightly more expensive for half module size.
- Hauling: Addition of camera for alignment helps
- Labor: 1 Picker driver, tarp crew (1 man/picker)
- Gin: No modifications necessary
- 365 hp engine













Farmers Union Gin

Farmers Union Gin

Farmers Union Gin

Farmers Union Gin



John Deere 7760 Round Module Picker

- Picker: ~ \$593,000 list price
- Weight: 65,000 lb shipping, 80,000 lb loaded
- Plastic wrap \$25/18 round modules, 1 time use
- Round modules contain ~ 5000 lb seed cotton (3.6B)
- Intermediate transport/staging fork available for \$13,000 to \$17,000
- Conventional truck; replace center 6 chains w/flat cleats add camera for alignment helpful
- Gin feeder/un-wrapper ~\$250,000
- Labor: 1 Picker operator, 1 Intermediate transport op.
- 500 hp engine “If you want horses, you gotta feed em”

1500 # Surge hopper

Bale chamber

3.6 bales/RM

500 Hp Engine

520/85 X 42 Dual
drive tires

Bale cradle

520/85 X 34 guide tires





Carries 4 rolls
Or ~260 bales
Plastic wrap





#13
2ND FIELD



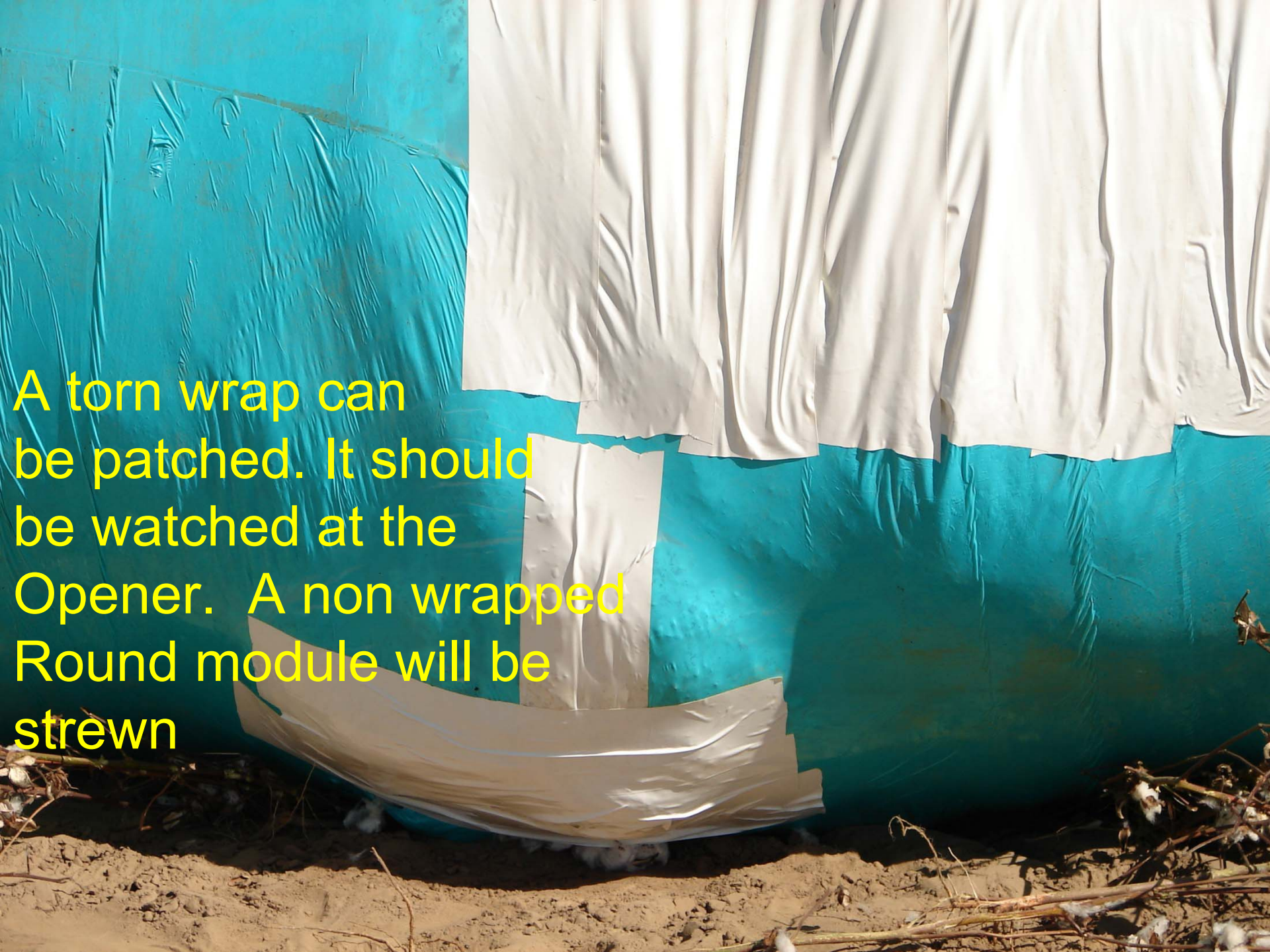
#15
2ND FIELD

1 Ft space between Round Modules
For air movement and loading



Staging forks will pull up stalks
that will be carried into the gin



A photograph showing a blue tarp with a white patch and a white plastic strip. The text is overlaid on the left side of the image.

A torn wrap can be patched. It should be watched at the Opener. A non wrapped Round module will be strewn











2007/05/10

Table 1: Harvest System Field Efficiencies at Six Locations Conventional 6 Row Pickers

Location	On Row	Turn	Wait to			Down	Yield
			Dump	Travel	Dump		
	(%)	(%)	(%)	(%)	(%)	(lb/ac)	
Delta 1	69.7	10.5			9.5	10.2	1187
Delta 1	70	17.1			5.8	7.2	1413
Delta 1	74.6	12.5	1		6.4	6.2	1413
Delta 2	49.4	8.6		11.9	8.5	21.7	
Delta 3	66.5	6.1	1.6		6.3	19.4	
Delta 4	66.4	17.5			5.1	10.2	
NC 1	76	9.9			4.6	7.9	
Average	67.514	11.743			6.6	2.586	

** includes lunch

Date	Equipment	Hrs Run	Fuel Used	Gal/Hr.
25-Oct	9986 JD Picker	11	125	11.4
	7130Case/Module Builder	11	14	1.3
	7140 Case/Boll Buggy	11	20	1.8
26-Oct	9986 JD Picker	10	110.84	11.1
	7130Case/Module Builder	10	20.34	2
	7140 Case/Boll Buggy	10	24.45	2.4
30-Oct	9986 JD Picker	10	120.57	12.1
	7130Case/Module Builder	10	20.95	2.1
	7140 Case/Boll Buggy	10	21.69	2.2

Date	Equipment	Hrs Run	Fuel Used	Gal/Hr.
31-Oct	9986 JD Picker	11	119.96	10.9
	7130Case/Module Builder	11	11.22	1
	7140 Case/Boll Buggy	11	17.97	1.6
1-Nov	9986 JD Picker	11	124.89	11.4
	7130Case/Module Builder	11	14	1.3
	7140 Case/Boll Buggy	11	12.55	1.1
Avg./day	System			14.74

Fuel Consumption Summary

<u>Grower</u>	<u>Fuel/engine hr</u>	<u>Fuel/acre</u>	<u>Fuel/bale</u>	<u>Yield (b/ac)</u>
Case 625 Module Exp	<u>12.97</u>	2.24		(Expect 14.25 gph)
JD 7760 RM	<u>18.49</u>	(Includes staging)		(Expect > 20 gph)
JD 9996 ND	13.91			
JD 9986 NC 2006	14.76			
JD 9996 SD 2006	16.18			
JD 9996 SD	14.77	2.65	1.17	2.27 17.05 b/m
JD 9986 CD	14.34	2.43	1.43	2.07 15.2 b/m
Avg. Conventional	<u>14.79</u>	2.54	1.30	

Ratio of Engine to Fan Hours

- 37 picker ads
- Average engine hrs 760
- Average fan hrs 598
- Fan operated 79% of time
- Servicing & travel = 21%

Case 625 Module Express

Advantages

- Weight: 65,000 fully loaded
- Price: \$450,000
- Fuel Consumption: ~ 14.5 Gal/hr hard running
- Picking Speed: 4.1 & 5.0 MPH
- Simplicity for Operator
- No gin modifications
- Inexpensive tarps only slightly > than conventional
- Productivity could ~ 80-85%

Case 625 Module Express

Disadvantages

- No intermediate transport device currently available
- Module capacity controlled by row length, yield
- Could end up with lighter truck loads in transport to gin
- Some sacrifice of picking capacity possible though not necessary
- Cotton loss equal to conventional
- Field to transport conversion time consuming

John Deere 7760 Advantages

- Non stop picking (for 18-20 round modules)
- Minimal cotton loss in field or transport
- Provides alternatives to transport
- Has intermediate transport forks for staging
- Could set round modules onto county roads for better access to transport truck
- Labor savings in wrapping/applying tarps
- Productivity could approach 85-90%
- Field to transport conversion in < 5 minutes

John Deere 7760

Disadvantages

- Price: \$593,000
- Weight: 65,000 empty – 80,000 loaded
- Wrap expense: \$25./18 round modules
- Complicated system
- Fuel consumption ~ 20 gal/hr
- Gin modifications ~ \$250,000 at gin to unwrap
- Plastic contamination is possible

Conventional 6 Row Picker, Module Builder, Boll Buggy Advantages

- Proven system
- 70% time on row
- Lower costs picker
- Operator friendly system
- Low fuel consumption
- Simple transport system, time saved in loading
- No gin modifications

Conventional 6 Row Picker, Module Builder, Boll Buggy Disadvantages

- Less Productive 70%
- Labor: ~ 4 men per picker
- Equipment: Picker, Module builder, boll buggy, 2 tractors
- Tractors could be utilized for field operations
- System reliability can be a problem when one machine fails

Thanks

Comments/Questions?