2022 Hamilton-Brant SCIA Compaction Event

Ancaster, Ontario

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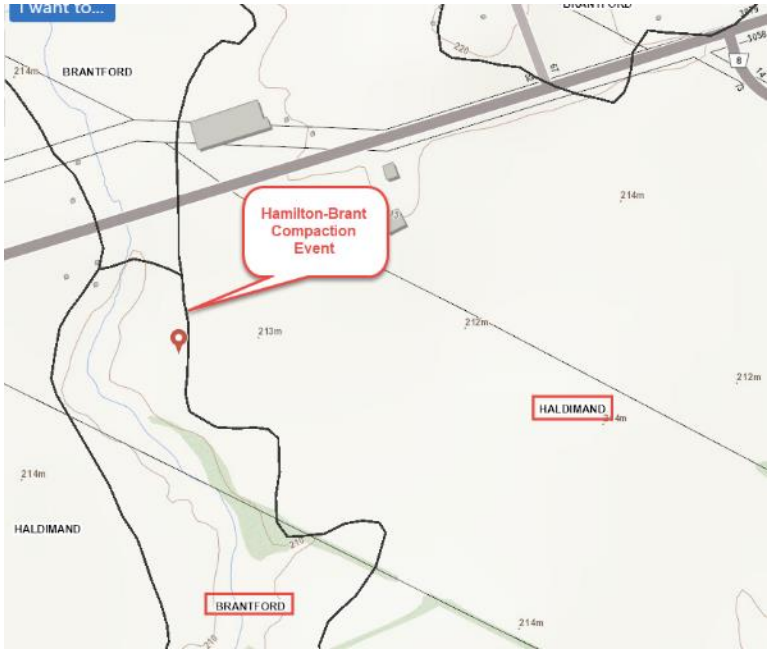
Hamilton-Brant SCIA Compaction Event

- The soil at the site was a Haldimand/Lincoln Heavy Clay and the soil was wet for the entire depth of 36”. Our comparisons were that unusual August wet conditions compared to even wetter soil when we applied additional water at the soil surface.
- Prior to the event, water was applied to the soil via sets of four 1000L totes arranged in a square with holes drilled in the bottom.
- The area watered needed to be longer and wider than any individual track or tire tested since the wetness was hoped to be uniform within this area for correct sensing.
- Water was applied several times to mimic spring or fall soil conditions on the dry surface of the wheat stubble. It is not known how uniform the soil wetness was throughout the soil profile used in the sensing demonstration.
- When the “wet” pits were located in the field, an additional set of pits were flagged off that would be the “dry” pits for the event. The wet and dry pits were co located so that a piece of equipment could travel over each set of sensors in a single pass. This allowed us to collect data on the compaction potential of each implement configuration under post wheat harvest conditions as well as mimic early spring or late fall soil conditions which tend to be much wetter than after wheat harvest.
- All equipment was cataloged and weighed by each wheel/track on day 1 and run over the sensors on day 2.
- Sensors were installed at depths of 6”, 12”, 20” using a custom designed apparatus. At the time of installation we do not know definitively if the above depths are correct, but when the sensors are uninstalled we check the depth and they have been within 1” for each depth at each event.
- Sensors were connected to a large display screen to share the real time response of each piece of equipment detected by the sensors and was recorded for later reporting.
- Sensors were measuring “pressure” detected at each depth.
- Pressure is used as a proxy to compaction susceptibility and is not a direct measure of soil compaction.

Site Soil Details

- The soil at the site was a primarily a Haldimand Heavy Clay (40-55% clay) close to a Brantford Soil (see next page for details) and the soil was wet for the entire depth of 36”.
- Our comparisons were the unusual wet post wheat harvest conditions compared to even wetter soil where we applied additional water at the soil surface to mimic spring or fall conditions.

Ontario Soils Maps – OMAFRA Agmaps



https://www.lioapplications.lrc.gov.on.ca/AgMaps/Index.html?vie
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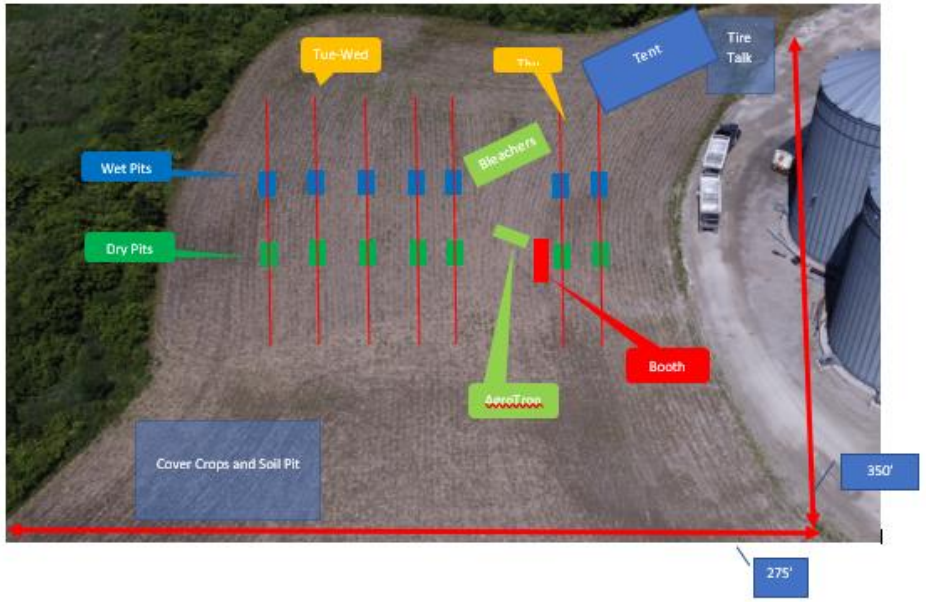
Site Layout



Site Soil Details (cont.)

HALDIMAND SOIL (HIM)

GENERALIZED PROFILE CHARACTERISTICS

PARENT MATERIAL — Clayey lacustrine sediments consisting of mainly clay or heavy clay textures.

DRAINAGE — Imperfectly drained

USUAL CLASSIFICATION — Gleyed Brunisolic Gray Brown Luvisol

MEAN HORIZON VALUES

Horizon	No. of Samples	Depth at Horizon Base(cm)	Gravel %	Sand %	Silt %	Clay %	Texture	O.M. %	pH $CaCl_2$	$CaCO_3$ %
Ah	5	19	0	4	56	40	SIC	3.9	6.6	0.9
Bmgj	3	43	0	3	49	48	SIC	1.4	7.2	2.9
Btgj	3	52	0	1	44	55	SIC	0.9	7.1	0.3
Ckg	7		0	2	23	74	HC	0.5	7.6	12.9

Compacted 2”- 8” layer

BRANTFORD SOIL (BFO)

GENERALIZED PROFILE CHARACTERISTICS

PARENT MATERIAL — Varved clayey lacustrine sediments consisting of silty clay loam or silty clay textures.

DRAINAGE — Moderately well drained

USUAL CLASSIFICATION — Brunisolic Gray Brown Luvisol

MEAN HORIZON VALUES

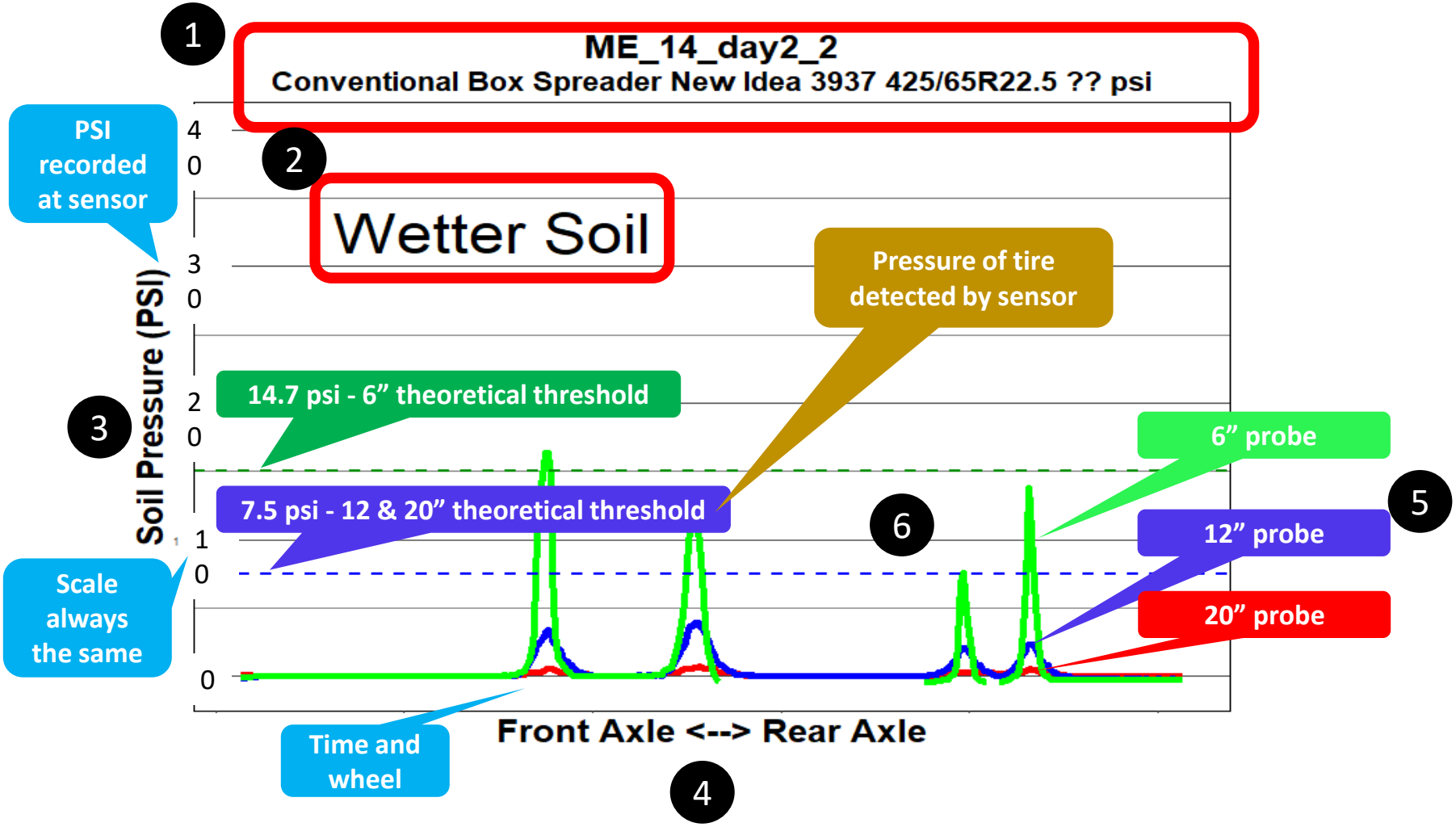
Horizon	No. of Samples	Depth at Horizon Base(cm)	Gravel %	Sand %	Silt %	Clay %	Texture	O.M. %	pH $CaCl_2$	$CaCO_3$ %
Ah	6	16	0	23	53	24	SIL	5.0	7.1	0.4
Bm	7	29	0	19	62	19	SIL	1.6	6.8	0.1
Bt	8	52	0	14	51	35	SICL	0.9	7.2	2.2
Ck	7		0	3	61	36	SICL	0.3	7.6	18.0

https://sis.agr.gc.ca/cansis/publications/surveys/on/on55/on55-v2_report.pdf

Interpreting the Data

- The data collected at these events is not rigorously collected scientific data but its aggregation shows trends that can direct us in the correct path to lower our risk of soil compaction.
- But it is more than simple “demonstration”!
- The data from an individual equipment pass should not be used for decision making.
- For a typical event, the team weighs and senses each piece of equipment. Multiple sets of Wet/Dry pits are prepared and used depending on how well the soil in the trafficked pits resists the stress. Thus different pieces of equipment or even the same equipment may have been tested on different sets of sensor pits. Our experience has shown that we often get significant differences in response from the same equipment across different sensors located within as close as 30 feet of each other, and 30 feet is the distance we select to allow safe traffic flow around pits when preparing for an event.
- The other important variable to be aware of is that our sensor at the end of the pressure tubes is only 6” long, such that we may miss being directly over the critical sensing part of the sensor with the tire when an individual piece of equipment passes over. We try to ensure that any passes that are obviously not correct are abandoned and not included in the data.
- Refer to our overall Soil Compaction Event Learnings document for the aggregate determination of trends from all of the compaction events.

Typical Layout of Response Charts



Understanding the Charts

- Referring to the diagram on the page above, all exhibits receive a similar chart.
- To support your interpretation of the exhibit, the charts are organized as follows:
    1. Title at the top that gives a brief description of the setup tested.
    2. Indicates whether the data is from a “Wet” or “Dry” pit, where the wet is one that has been watered and the dry is that condition of the field as it is.
    3. “Soil Pressure” in “Pounds per Square Inch” (PSI) is measured on the “Y” axis.
    4. Time/axle is measured on the “X” axis, and should be read from left to right, so the most left set of curves will be the first wheel to cross the sensor, usually the front wheel of the power unit, but not always since sometimes the front wheel is missed or mostly missed in lining up the rear dual of a tractor.
    5. The pressure response from the sensors to the travel of the tires over the sensor are “Green=6”, Blue=12” and Red=20” sensor”.
    6. From European work for a “general soil” there, scientists have estimated that 14.7 PSI is the theoretical threshold for which pressure should be below at the 6” depth (note dotted **GREEN** Line), and below 7.5 PSI at the 12” and 20” depths (note dotted **BLUE** Line). We have not validated those thresholds in Ontario but having them there offers the viewer an indication of the severity of compaction potential associated with a given configuration of equipment.

- **CAUTION – some of the equipment may not have directly navigated over the sensors, do not use an individual set of response curves as the definitive answer as to whether the observed equipment configuration is more or less prone to causing soil compaction**

Important Reminder

- Soil Compaction Events conducted by OSCIA and other event coordinators in cooperation with the Ontario Soil Compaction Team, **are not a COMPETITION!**
  - The equipment used in the events made possible from committee members, individual farmers and equipment sponsors are a platform to test various configurations of equipment.
  - All of the platforms used can have similar configurations outfitted on them.
  - Any power unit or towed implement can be configured to lessen the risk of soil compaction.
  - Users of this information are encouraged to engage with others in finding the best solutions to their particular situations.

Key Learnings

- To lower the threat of soil compaction the compaction events have identified the following learnings:

  - Dryer soil is less susceptible to soil compaction than wet!
  - Lighter equipment is less likely to cause compaction compared to heavier equipment.
  - The more of (axles, duals, triples) and the better quality of tires (VF>IF>Radial>>>Bias) that are available on a piece of equipment that can operate at lower tire pressures will reduce the risk of soil compaction.
  - Where significant loads are carried routinely over roads and fields, Central Tire Inflation Systems (CTIS) are an important consideration to optimize tire pressure for the situation and therefor equipment operation to minimize the potential for soil compaction.
  - Compromising on tire pressure regarding road and field recommendations is highly discouraged, it just leads to trouble!
  - Tracks can be a good option where increasing tire size/number is not possible, BUT, you have to consider the cost, extra weight, extra maintenance that often come with converting to tracks.
  - Additionally with tracks, there is no doubt that they can go through more tough conditions BUT if they are carrying similar total and axle weight to a wheeled option, they run the same risk of soil compaction, if not worse because of tearing up the soil more than would happen when you elected not to put a wheeled piece of equipment in the field because the conditions were too marginal.

Addressing Soil Compaction

There are many ways to protect yourself from soil compaction. Compaction is not a moment in time issue. Avoiding compaction in the moment and being set to buffer against compaction is an ongoing management challenge but implementing some or all of the below is a good way to start!

1. Tile Drainage
2. Build Better Soils
3. Avoid Wet Soils
4. Bigger Tires
5. Lower Tire PSI
6. Use Inflation/Deflation Systems
7. Better Tires
8. More Tires/Axles
9. Less Passes
10. Less Tillage
11. Control Traffic
12. Lower Load Weights
13. Choose configurations carefully
14. Be Patient

The management decisions listed that can reduce soil compaction are in no particular order.

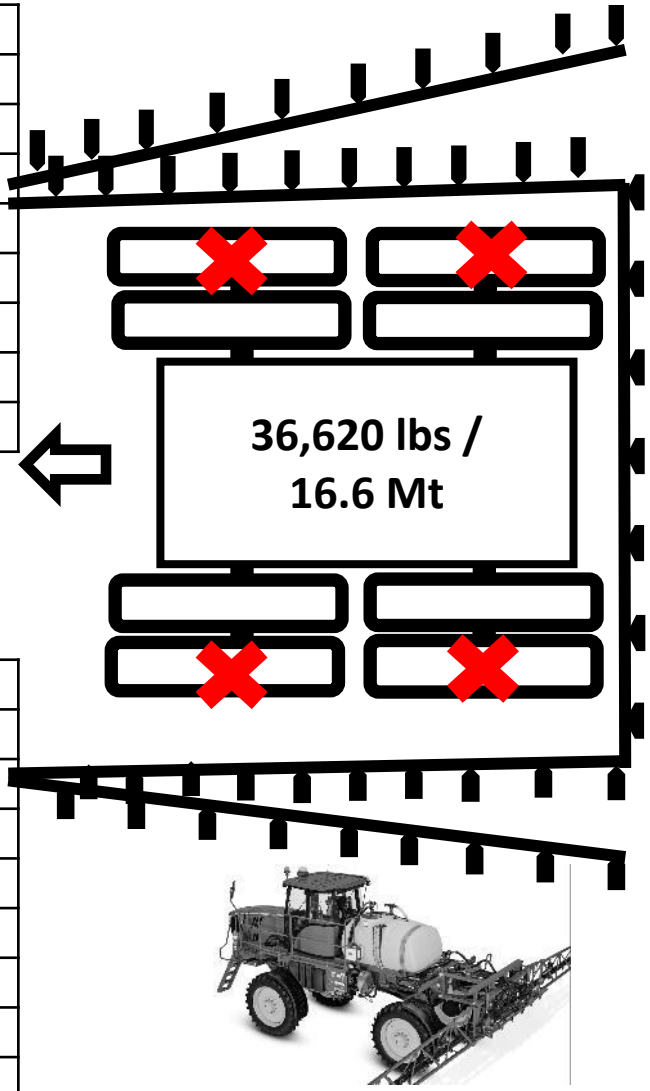
2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB01
John Deere 4830 Self Propelled Sprayer with CTIS and IF380/90R46 vs 650/65R38


650/65R38
IF380/90R46

Exh#:	HB1	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:		Phone#:
EquipType:	Sprayer	Make:	John Deere	Model: 4830

INFO	Inside	Outside
Tire/Trk Make:	Goodyear	
Tire Model:	Ultra Sprayer	
Tire Type:	168 D	
Tire Size:	IF 380/90 R46	
TireWt (lbs):	5560	
Road PSI:	55	
Field PSI:	20	
OnArrival PSI	50.5	



INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Spraybib	
Tire Type:	VF	
Tire Size:	380/90 R46	
TireWt (lbs):	13780	
Road PSI:	55	
Field PSI:	30	
OnArrival PSI	35.7	

INFO	Inside	Outside
Tire/Trk Make:	Mitas	
Tire Model:	AC65 166D	
Tire Type:	169 A8	
Tire Size:	650/65 R38	
TireWt (lbs):	5400	
Road PSI:	30	
Field PSI:	8	
OnArrival PSI	26.5	

INFO	Inside	Outside
Tire/Trk Make:	Mitas	
Tire Model:	AC65 166D	
Tire Type:	169 A8	
Tire Size:	650/65 R38	
TireWt (lbs):	11880	
Road PSI:	30	
Field PSI:	16	
OnArrival PSI	27.5	

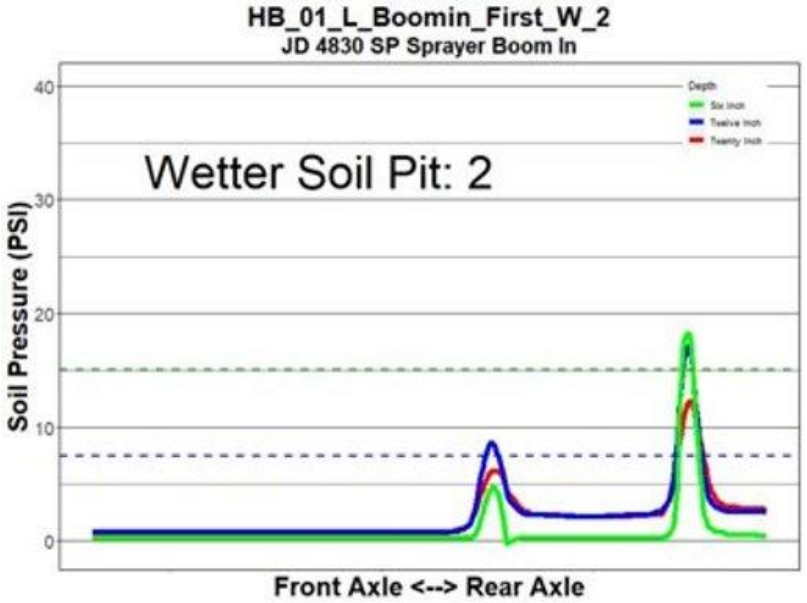
SP Sprayer – Rear Boom

Empty or Loaded?

Boom Road or Field?

CTIS: Yes / No?

Graph 1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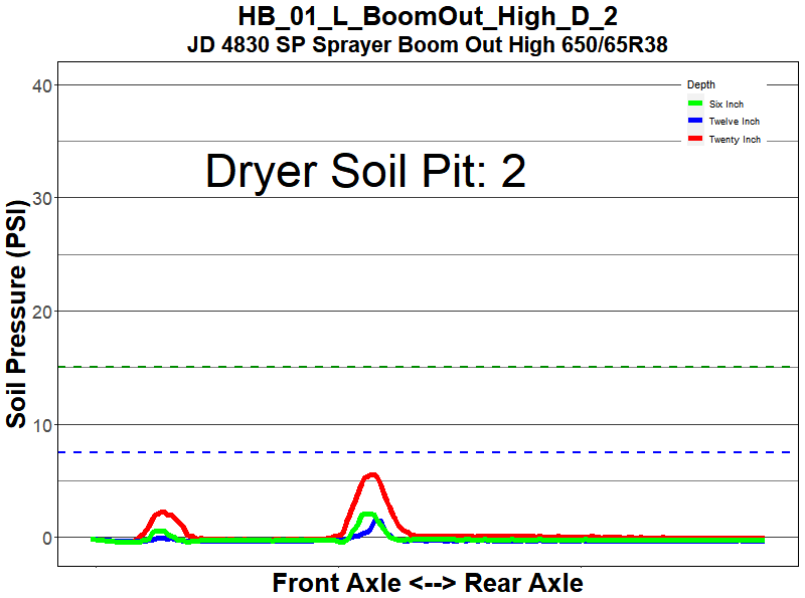
JD 4830 SP Sprayer Boom In
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle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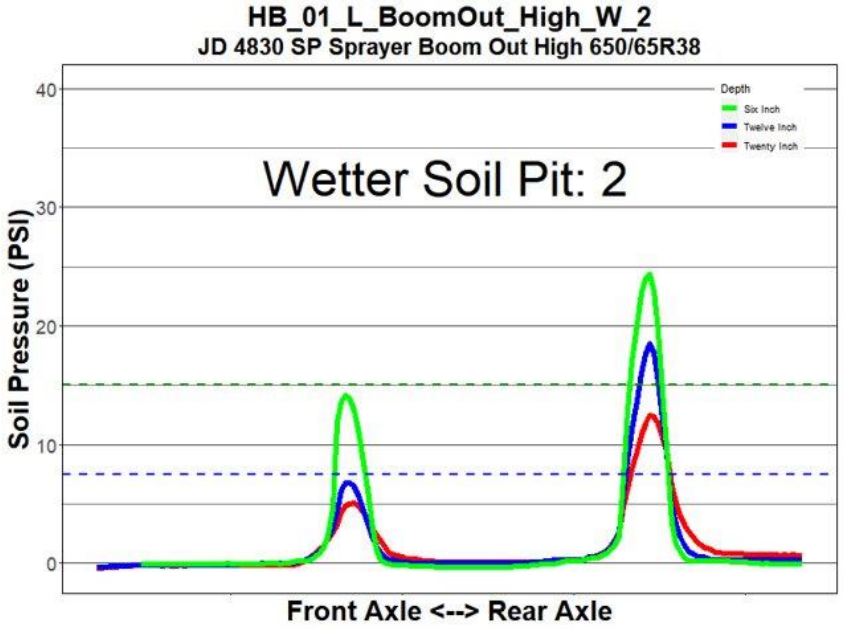
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle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Wetter Soil Pit: 2
Depth
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Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
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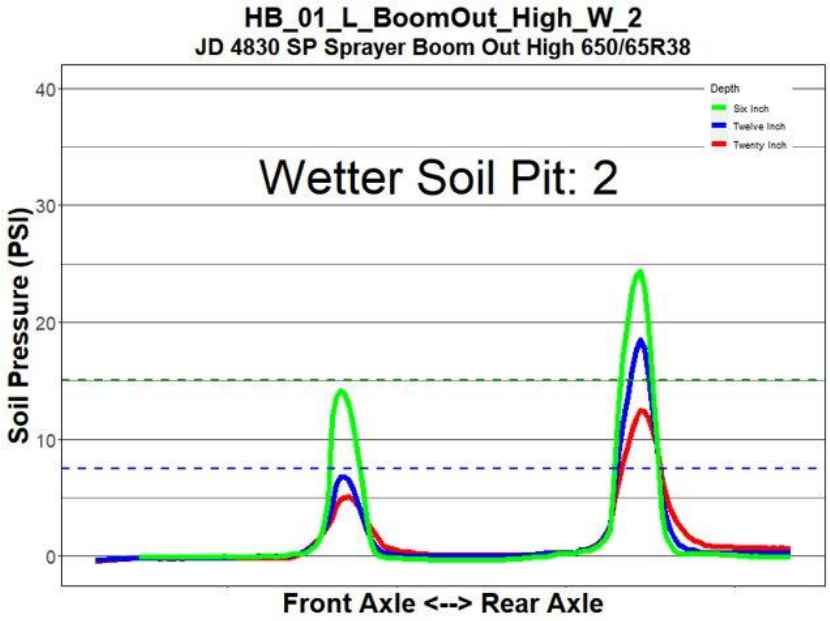
Front Axle <--> Rear Axle

Graph 2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Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
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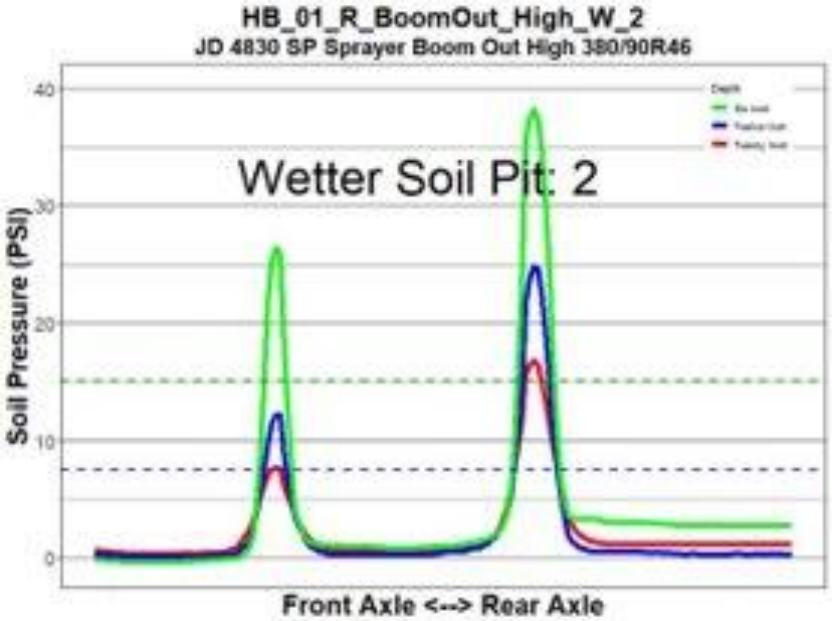
40
Front Axle <--> Rear Axle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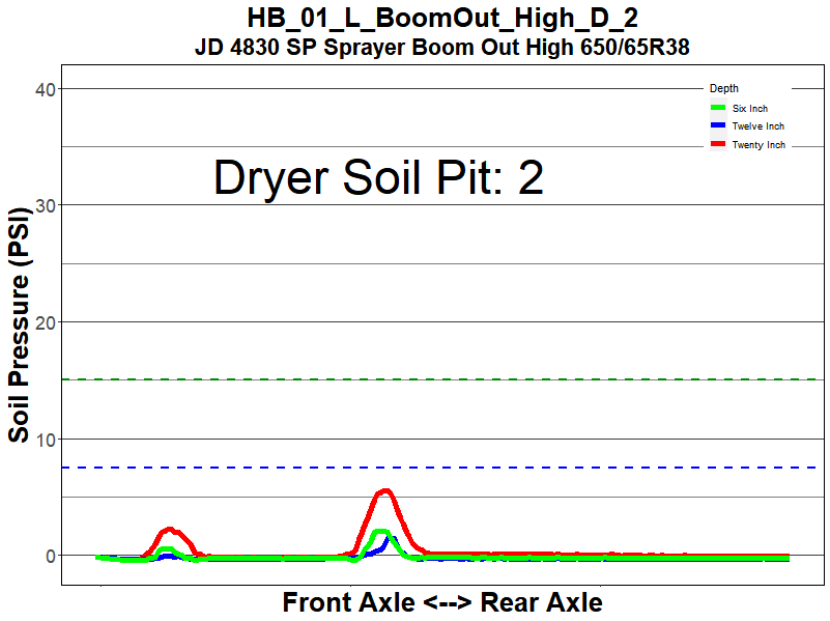
Wetter Soil Pit: 2
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle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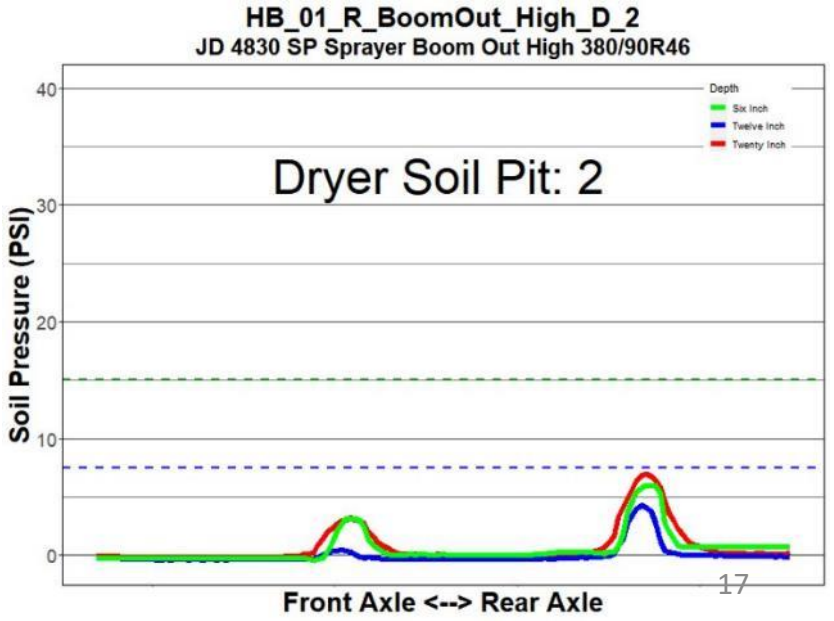
JD 4830 SP Sprayer Boom Out High 650/65R38
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle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Dryer Soil Pit: 2
Depth
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Twelve Inch
Twenty Inch
Soil Pressure (PSI)
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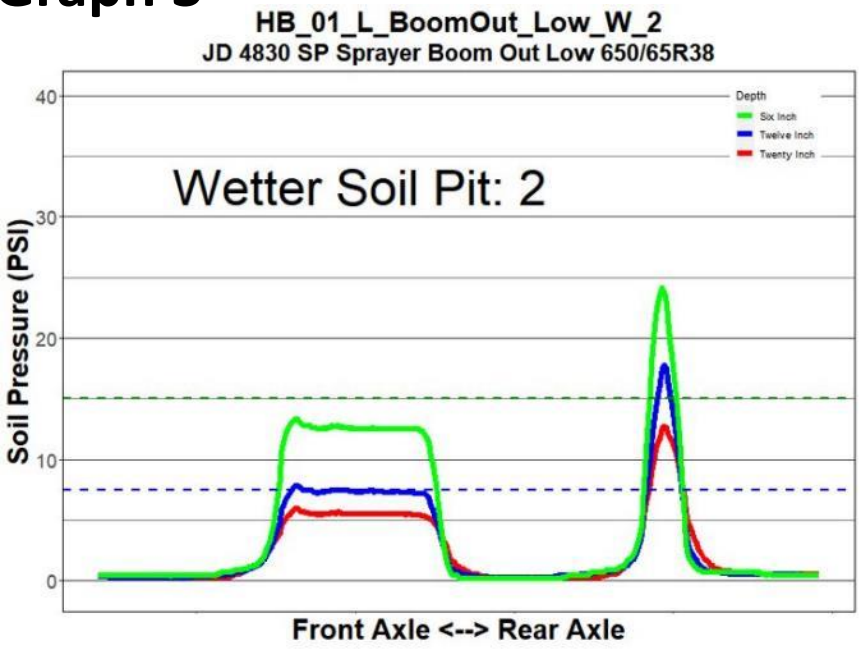
Front Axle <--> Rear Axle

Graph 3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Wetter Soil Pit: 2
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Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
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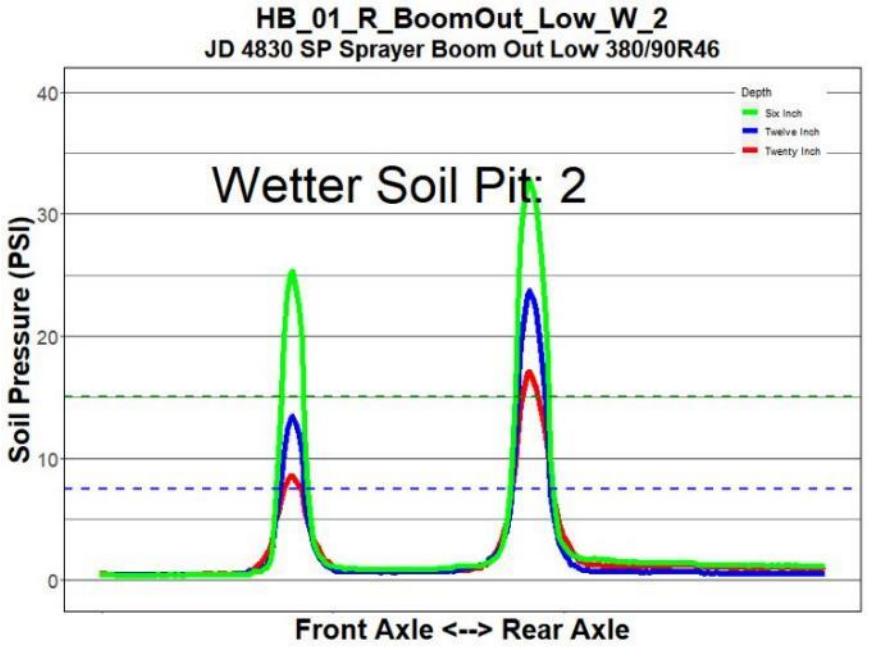
20
30
40
Front Axle <--> Rear Axle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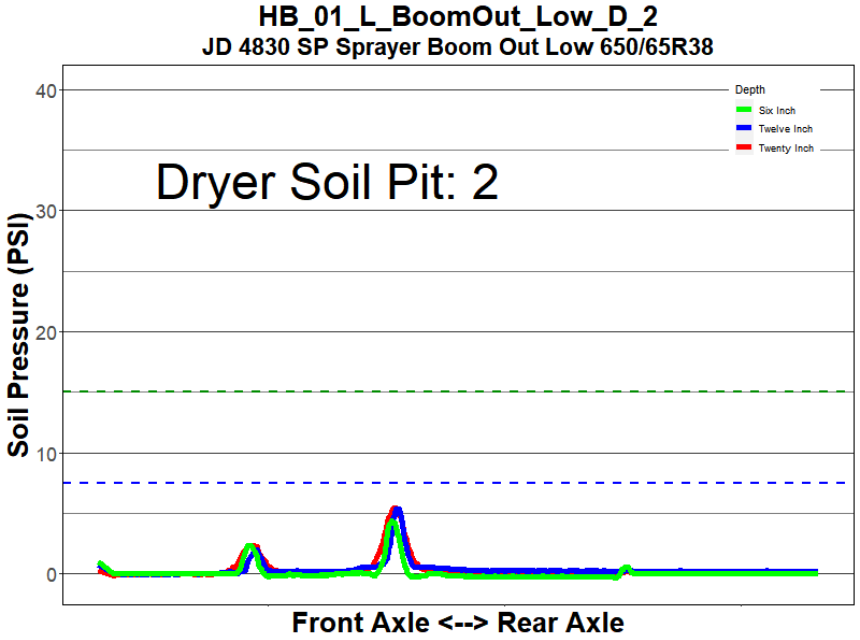
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle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Dryer Soil Pit: 2
Depth
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Twelve Inch
Twenty Inch
Soil Pressure (PSI)
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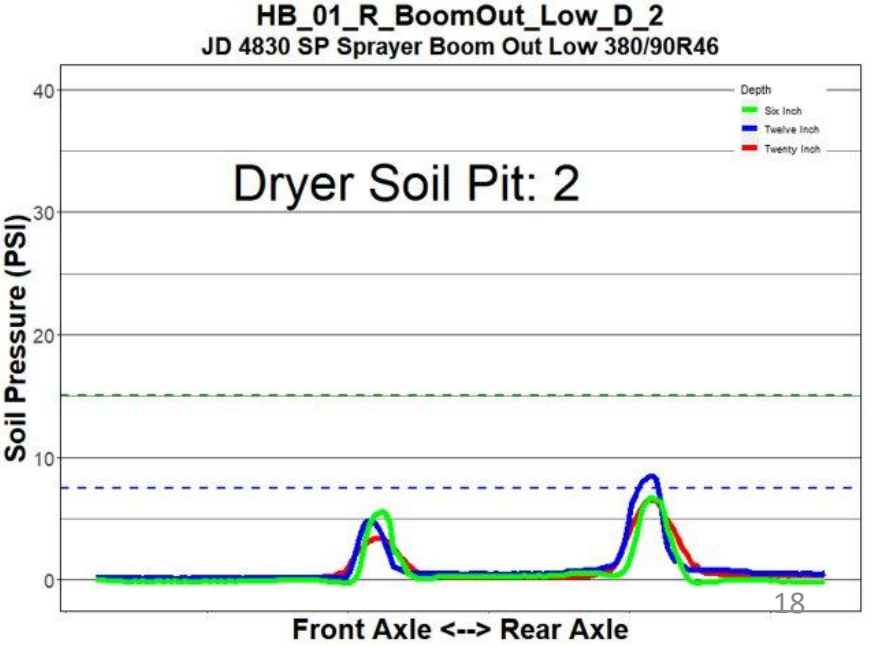
Front Axle <--> Rear Axle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JD 4830 SP Sprayer Boom Out Low 380/90R46
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
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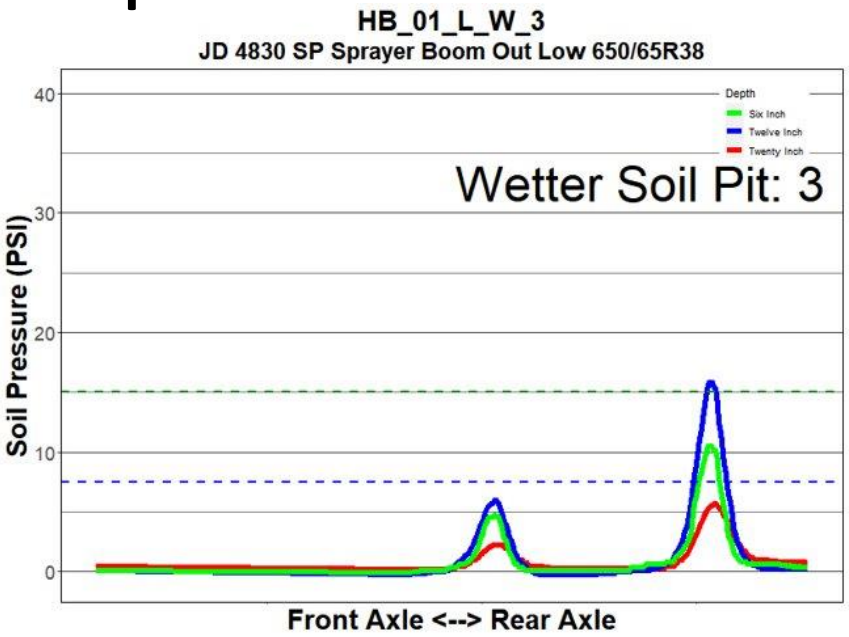
40
Front Axle <--> Rear Axle

Graph 4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Wetter Soil Pit: 3
Depth
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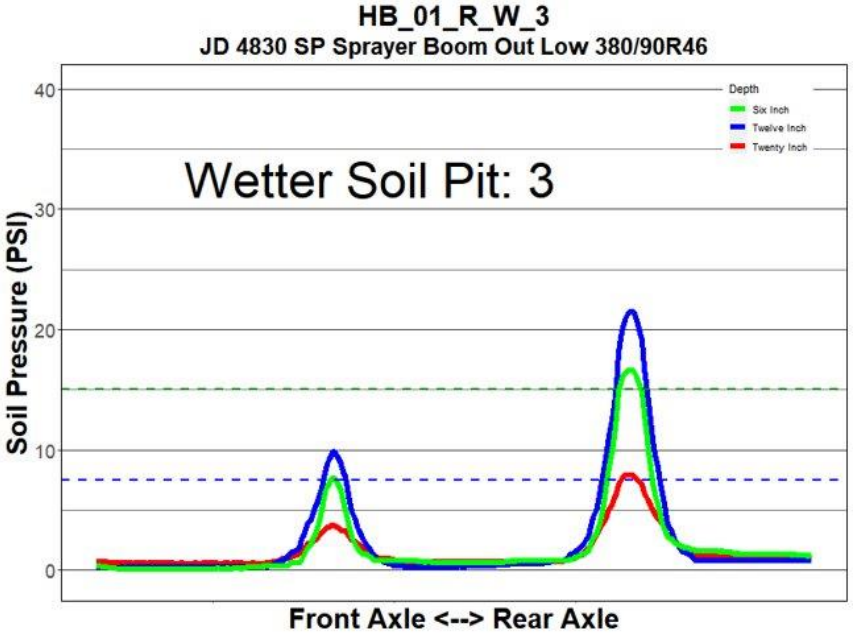
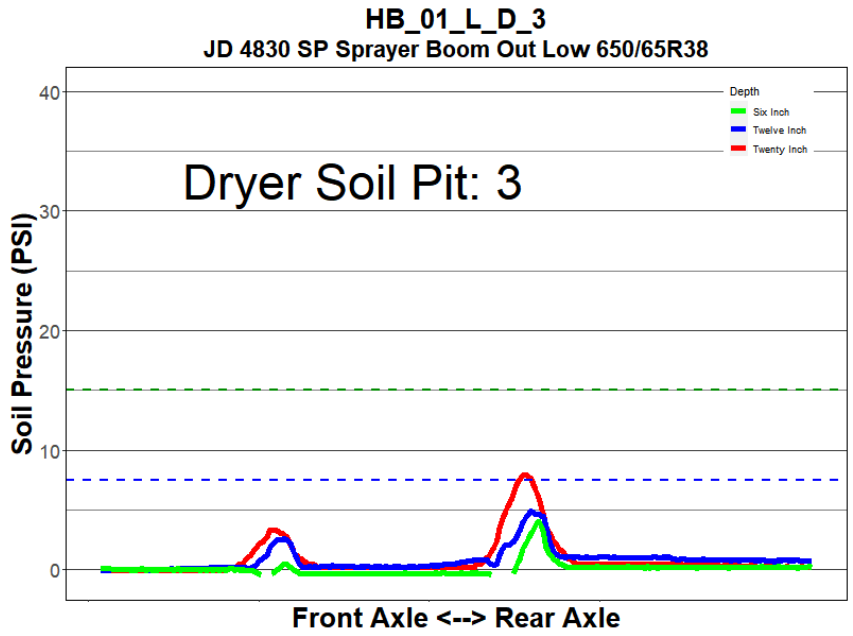
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_01_R_W_3
JD 4830 SP Sprayer Boom Out Low 380/90R46
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle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Dryer Soil Pit: 3
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Twelve Inch
Twenty Inch
Soil Pressure (PSI)
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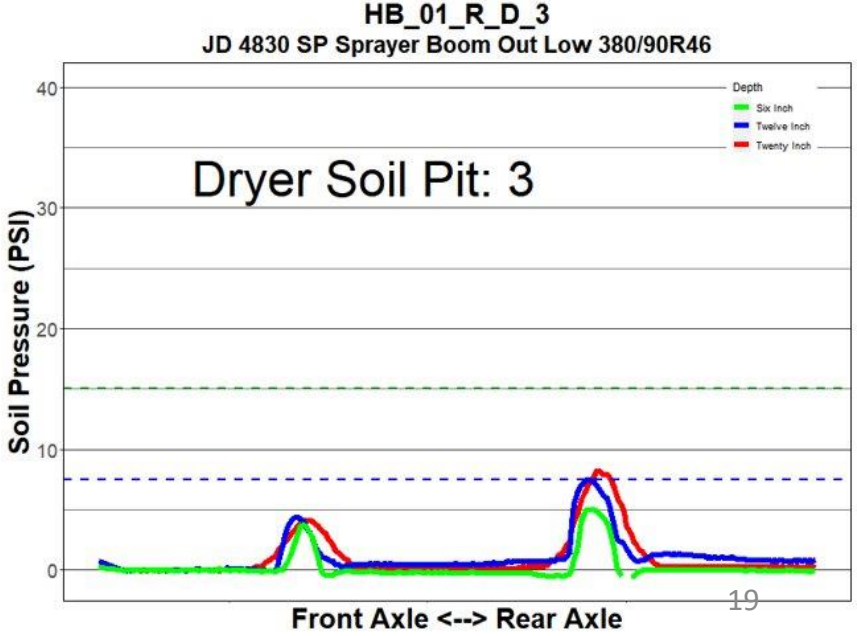
Front Axle <--> Rear Axle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Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
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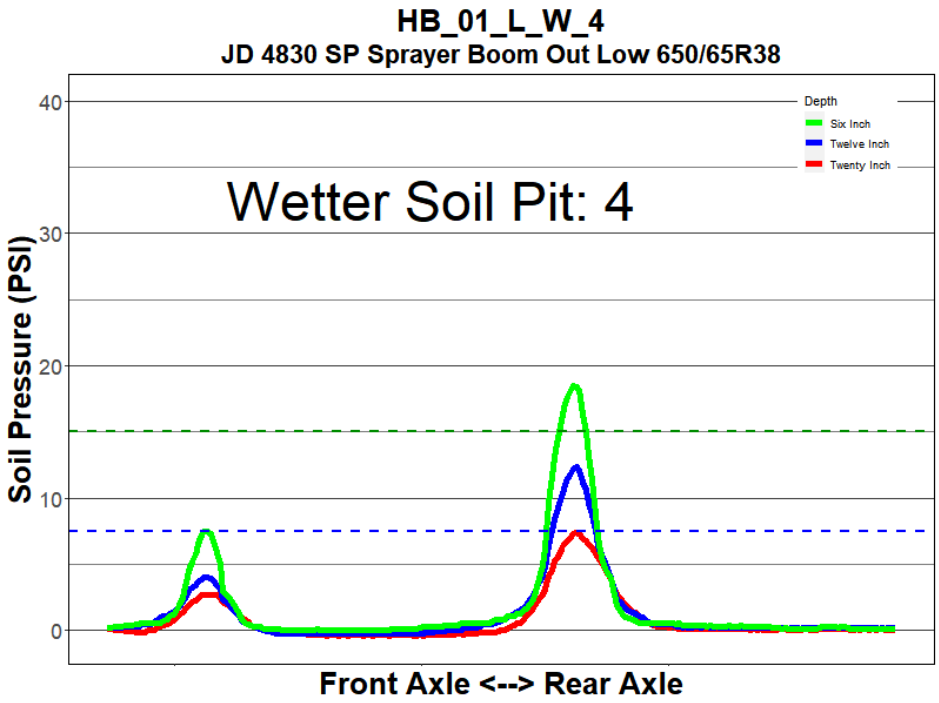
20
30
40
Front Axle <--> Rear Axle

Graph 5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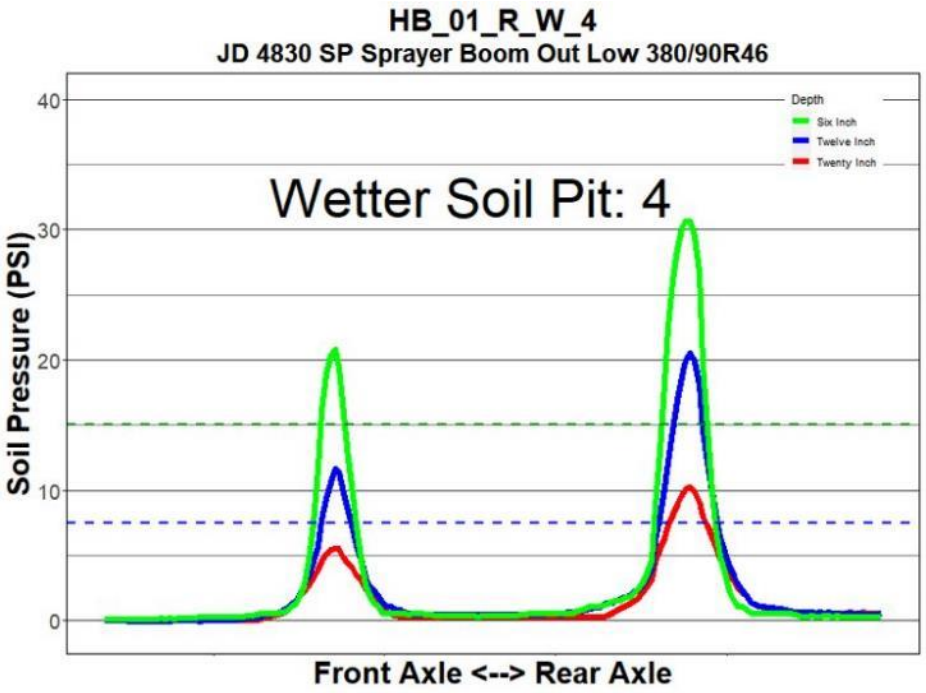
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle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Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Plot Comments – HB01

- Note 2 types of tires – Left 650/65R38 Wide vs Right IF380/90R46 tires.
- Equipped with CTIS so Left 30/8front+16rear road vs field.
- Right 55/20front+30rear road vs field tire PSI.
- Tire volume greatly impacts recommended tire setting for road vs field (bigger gives lower PSI options vs narrower tires) for max load.
- Graph 1
  - As the boom moves to field position weight goes towards the back of the unit and shows more pressure into the soil at high PSI for wetter soil at 20” depth.
- Graph 2
  - Wide vs narrow – at high PSI, reduction in soil stress at all depths with wider tire regardless of wet vs dry, but drier is less susceptible to compaction.

Plot Comments – HB01 (cont)

- Graph 3
  - We were surprised to not see more difference in stress for the wide tire, at the high and low PSI.
  - We would expect significant reduction in stress recorded as the tire PSI was lower and the tire size increased.
- Graph 4
  - Low PSI and wide vs narrow left to right shows more stress in wet pit with narrower tire, but not as different as we have seen at other events.
  - Dry soil for each tire size results in lower stress to the soil vs wet soil, so narrow tires in-season work because the weather usually results in drier soil during in crop application windows.

Plot Comments – HB01 (cont)

- Graph 5
  - This was wet pit only of wide vs narrow tires at low PSI, showing again the benefit of wider tires to reduce the occurrence (but not eliminate it) of compaction during the spring and fall seasons that tend to be wetter.


HB1

2022 Hamilton-Brant SCIA Compaction Event

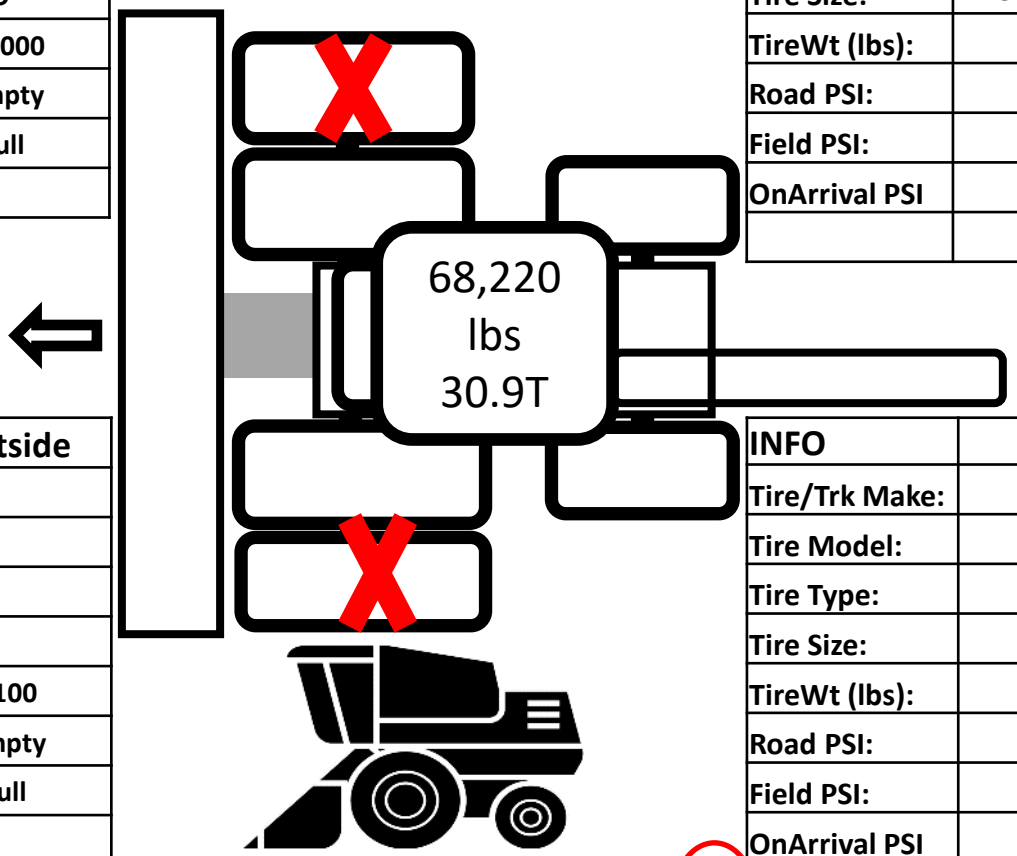
Exhibit: HB02
Case 7240 Combine with IF1250/50R32 Front vs 750/65R26 Rear Tires


CASE IH
AXIAL-FLOW
AFS
7240
MacDon
FD140
FLEXWRAPER

Exh#:	HB-2	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:	Comley	OwnerName:	Comley	Phone#:
EquipType:	Combine	Make:	CIH	Model: 7240

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	Deep Tread	
Tire Type:	IF	
Tire Size:	1250/50R32 CFO	
TireWt (lbs):	12500+13500=24,000	
Road PSI:	23	empty
Field PSI:	23	full
OnArrival PSI	25	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:		
Tire Type:	Radial	
Tire Size:	750/65R26	
TireWt (lbs):	7860	
Road PSI:	17	empty
Field PSI:	17	full
OnArrival PSI		



INFO	Inside	Outside
Tire/Trk Make:		
Tire Model:		
Tire Type:		
Tire Size:		
TireWt (lbs):	13500+15600=29,100	
Road PSI:	23	empty
Field PSI:	23	full
OnArrival PSI	25	

INFO	Inside	Outside
Tire/Trk Make:		
Tire Model:		
Tire Type:		
Tire Size:		
TireWt (lbs):	7440	
Road PSI:	17	empty
Field PSI:	17	full
OnArrival PSI		

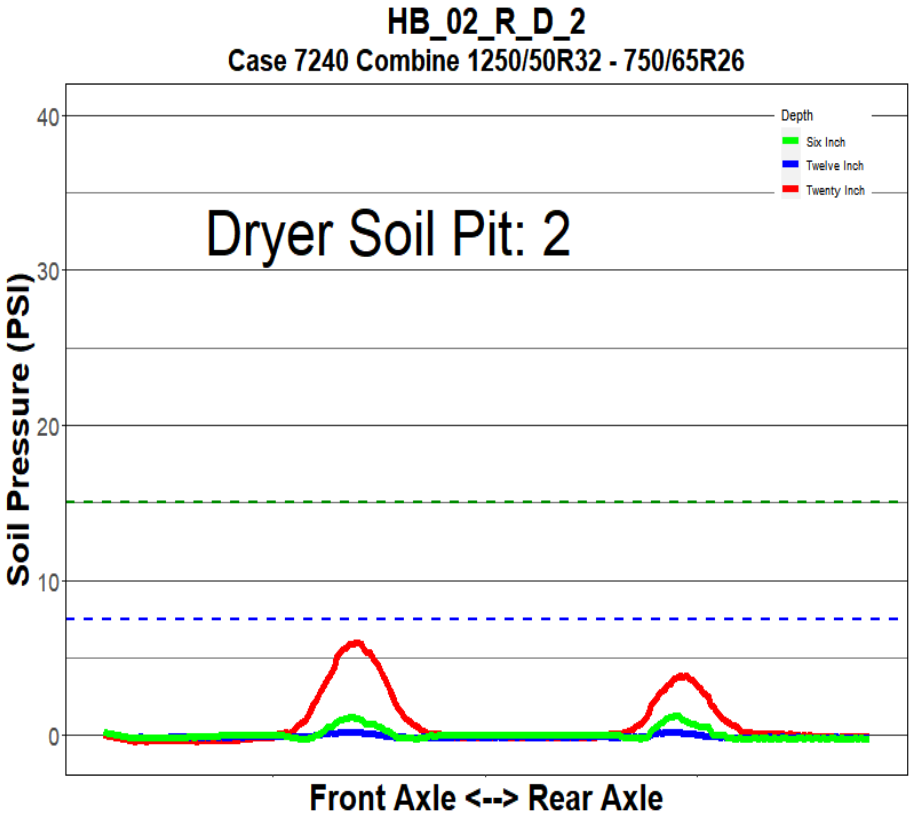
Combine - Wheeled

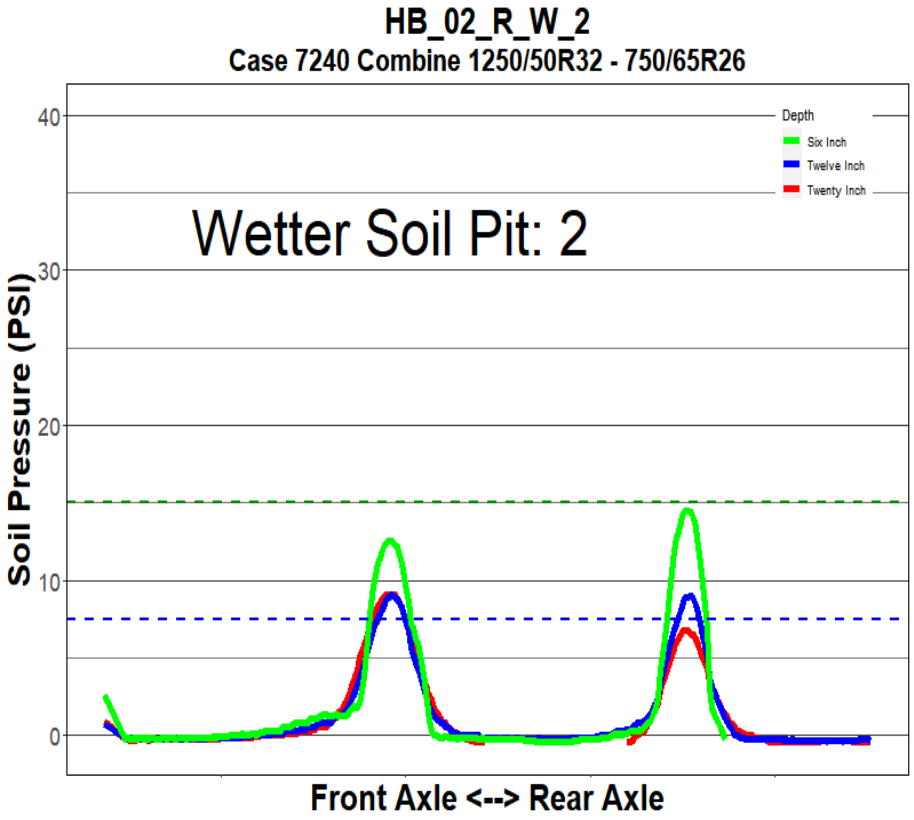
Empty or Loaded?

Header On: Yes / No

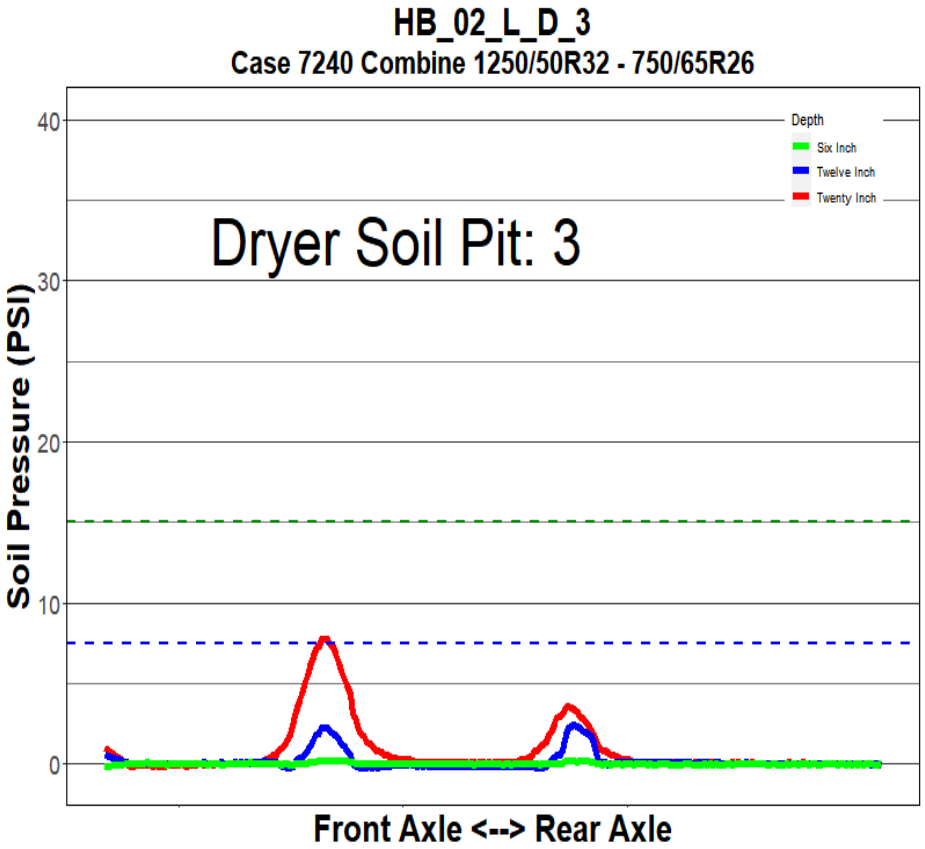
CTIS: Yes / No?

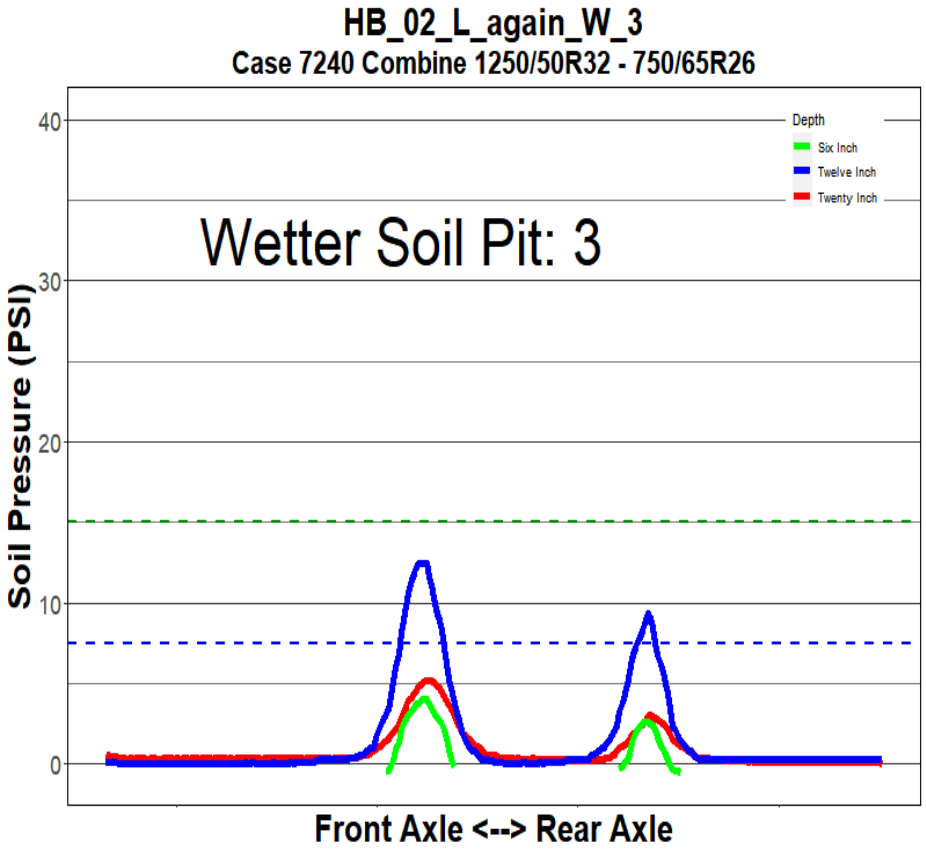
Graph 1


HB_02_R_D_2
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Dryer Soil Pit: 2
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

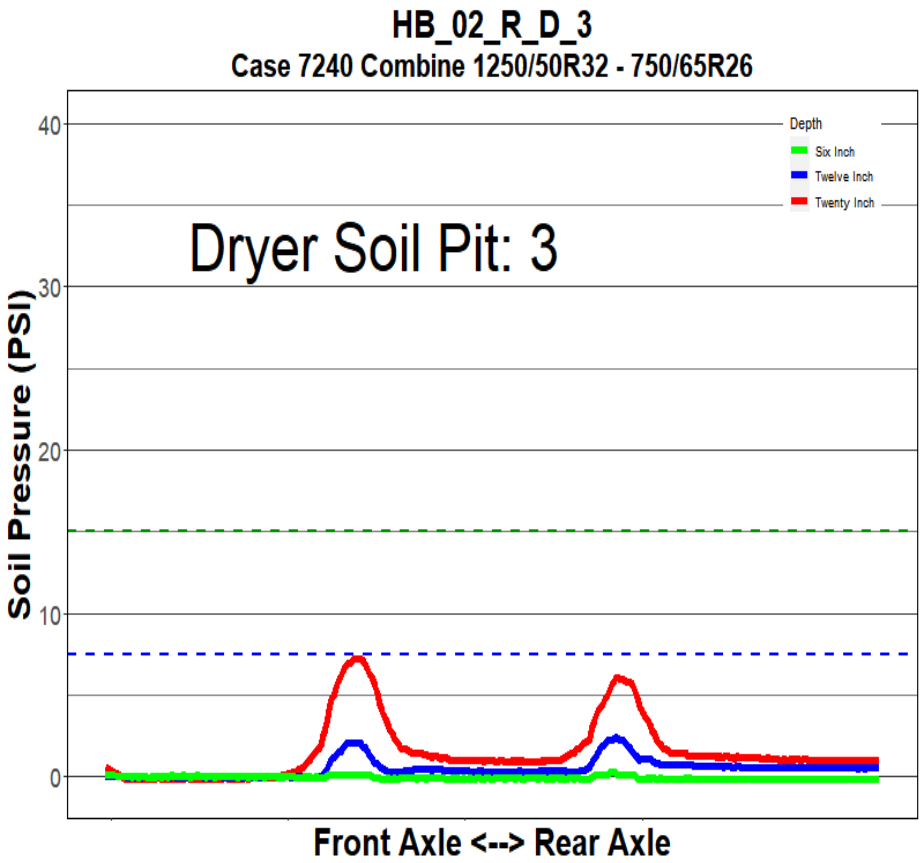

HB_02_R_W_2
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 2
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

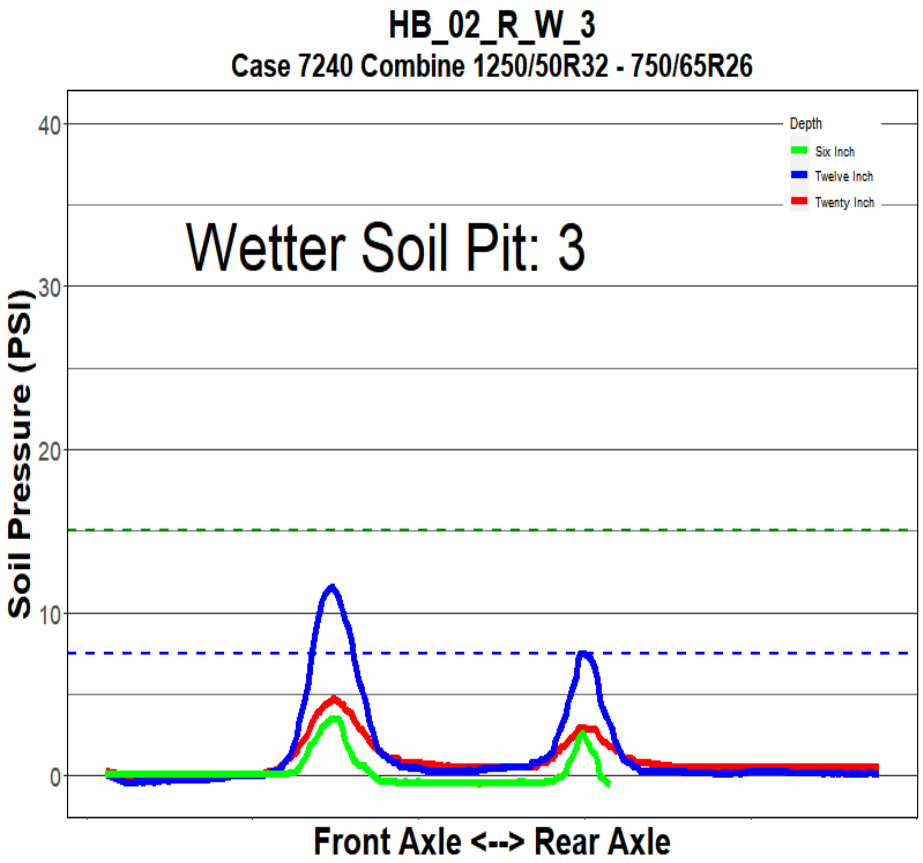
Graph 2


HB_02_L_D_3
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Dryer Soil Pit: 3
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

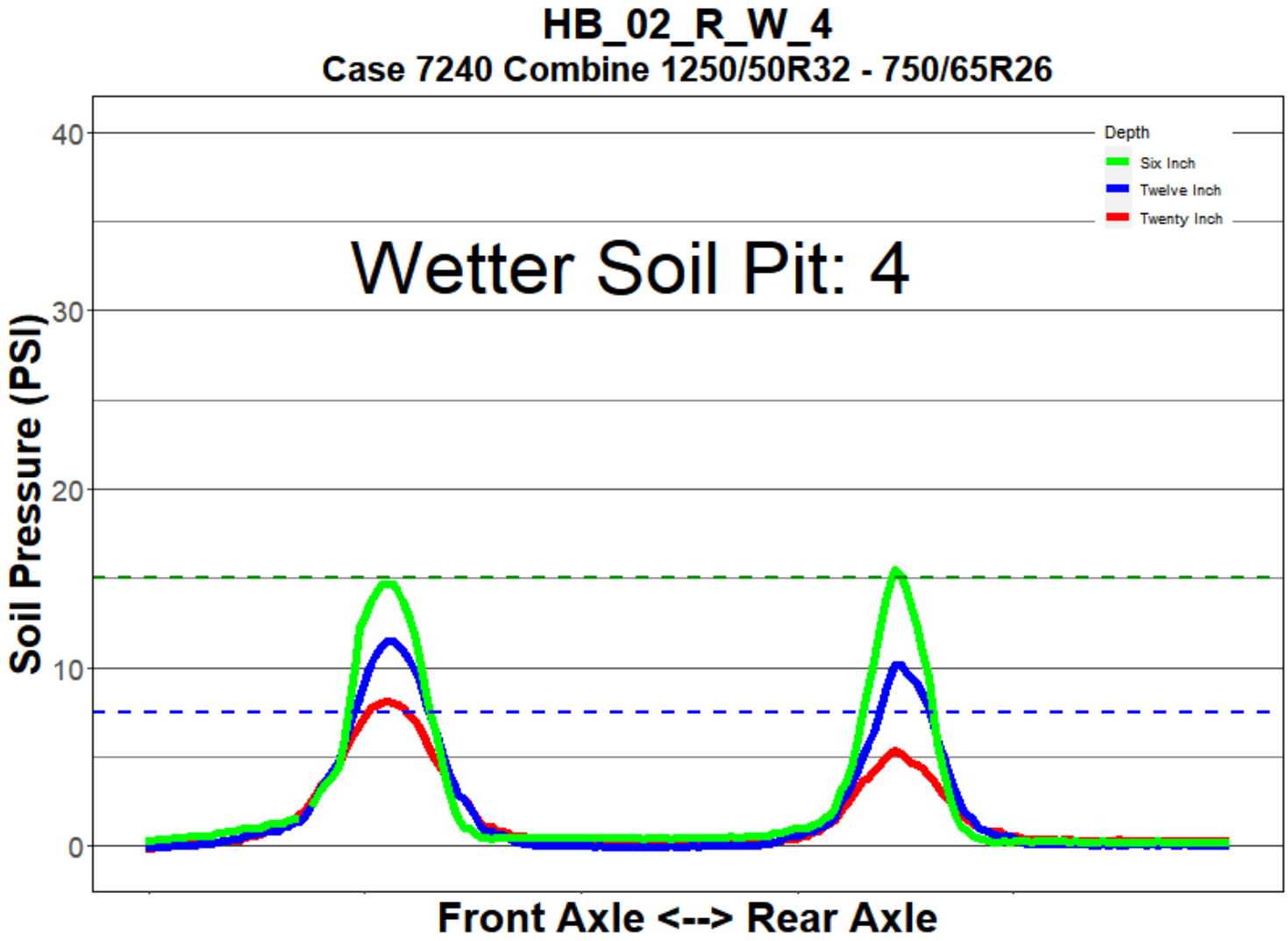

HB_02_L_again_W_3
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 3
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Graph 3


HB_02_R_D_3
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Dryer Soil Pit: 3
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_02_R_W_3
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 3
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Graph 4


HB_02_R_W_4
Case 7240 Combine 1250/50R32 - 750/65R26
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Plot Comments – HB02

- See page 3 where the PSI is the same for the tires on road vs field, but the combine is empty vs full for road vs field operation.
- Don’t run combines at road speed loaded on the road.
- Graph 1
  - This is a good setup for a combine.
  - The wetter soil experiences more stress than dry but not overly so.
  - The weight of combine transfers similarly to 20” depth as the wetted soil was likely not consistently wet to this depth compared to unirrigated test pit.
  - Front tires are putting more stress into soil than steering tire which is different from past experience where the compaction threat was coming from the steering tire.

Plot Comments – HB02

- Graphs 2+3
  - We do not have an answer for the differences between dry and wet pits in terms of the stress difference at the 3 depths, especially the 12” depth.
  - Wet soil is still for the most part showing more stress than dry soil overall as expected.
  - There was a significant compacted layer in the top 6-8” of the soil that appeared to be not letting the 6” probe experience the pressure and instead transferred that stress deeper in the soil.





CASE IH
7240

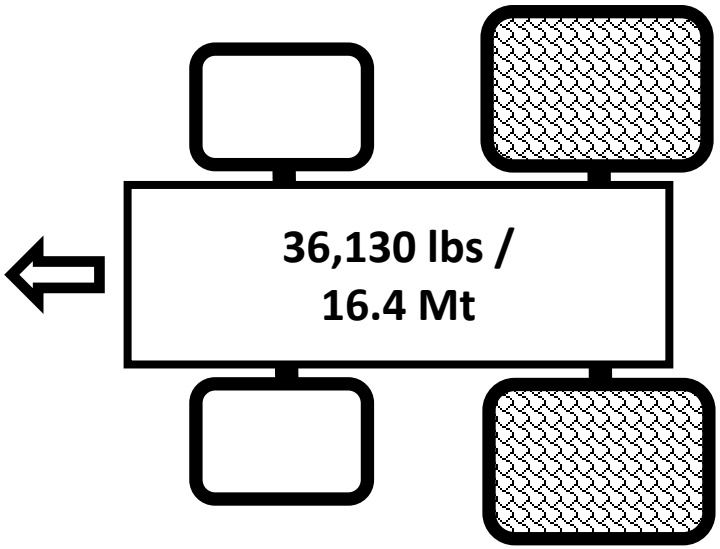
2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB03
Case Magnum 380 Row Crop Tractor with Rear Tracks


HB3
CASE IH
380
AFS
MAGNUM
CASE IH

Exh#:	HB3	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:	Miller	OwnerName:		Phone#:	
EquipType:	RC Rear track	Make:	Case IH	Model:	Magnum 380

INFO	Track
Tire/Trk Make:	Michelin
Tire Model:	Axiobib
Tire Type:	VF
Tire Size:	650/65 R34
TireWt (lbs):	7480
Road PSI:	12
Field PSI:	9



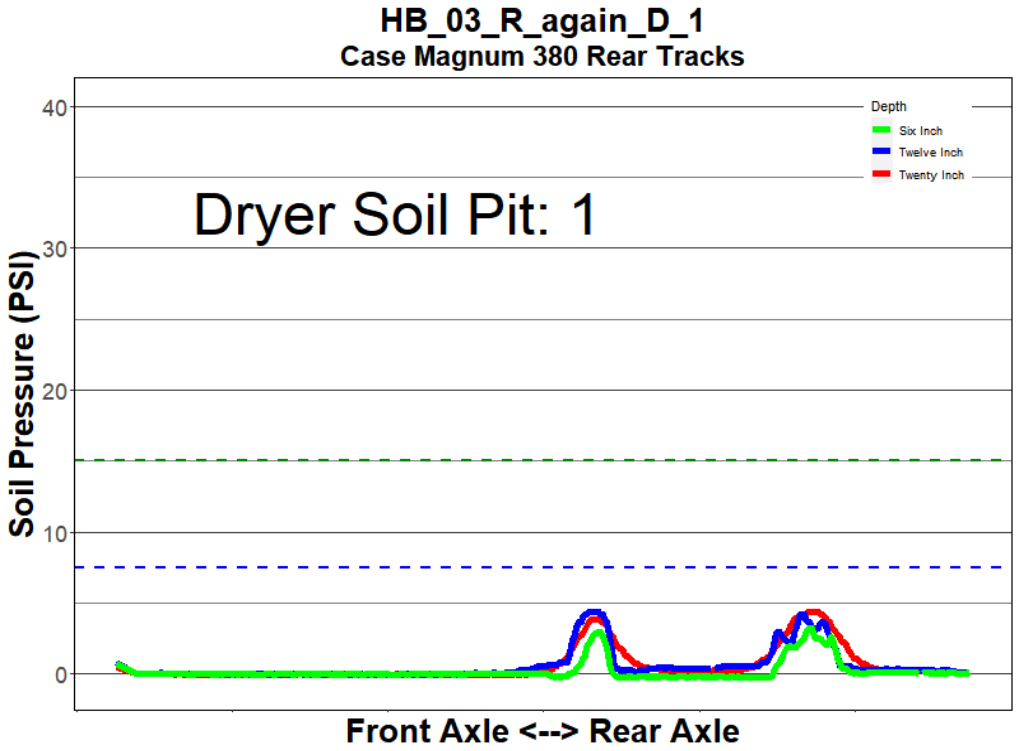
INFO	Track
Tire/Trk Make:	Camso
Tire Model:	
Tire Type:	4W5038/48035554
Tire Size:	
TireWt (lbs):	10,770
Road PSI:	
Field PSI:	

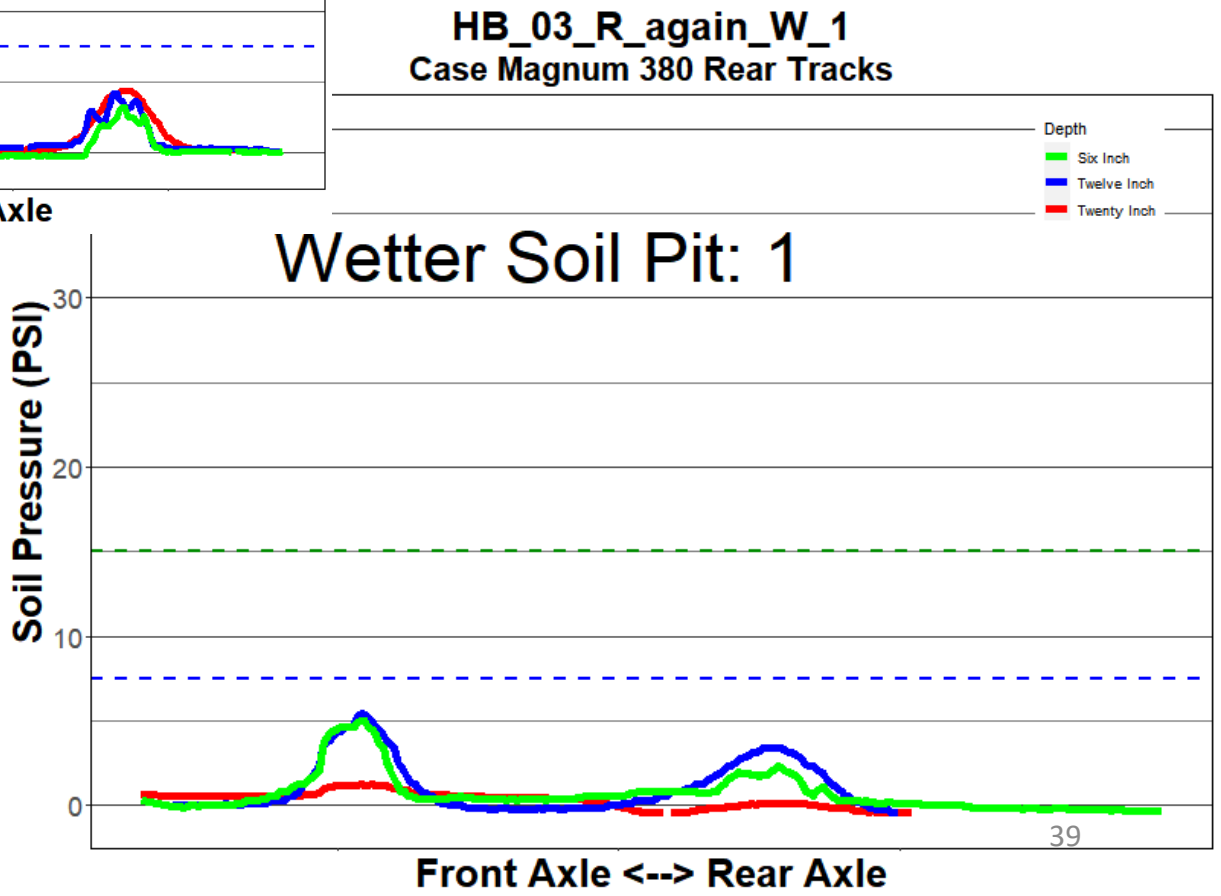
INFO	Track
Tire/Trk Make:	Michelin
Tire Model:	Axiobib
Tire Type:	VF
Tire Size:	650/65 R34
TireWt (lbs):	7480
Road PSI:	12
Field PSI:	9

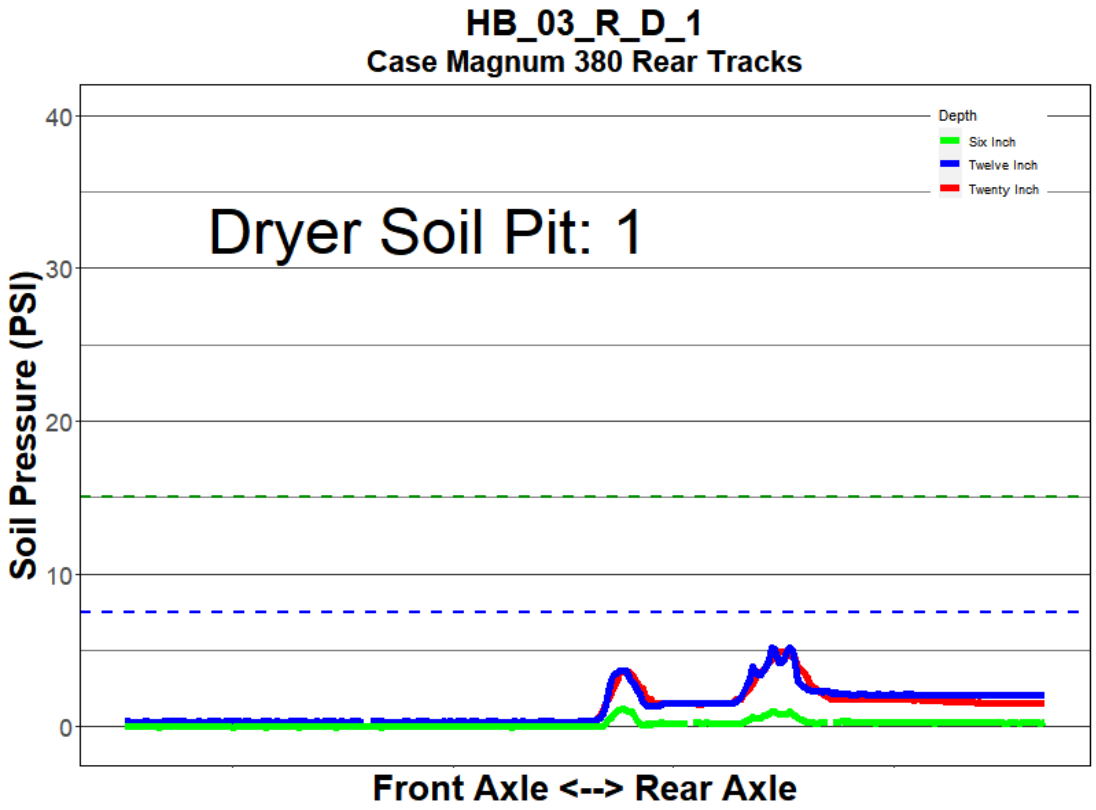
INFO	Track
Tire/Trk Make:	Camso
Tire Model:	
Tire Type:	4W5038/48035554
Tire Size:	
TireWt (lbs):	10,380
Road PSI:	
Field PSI:	

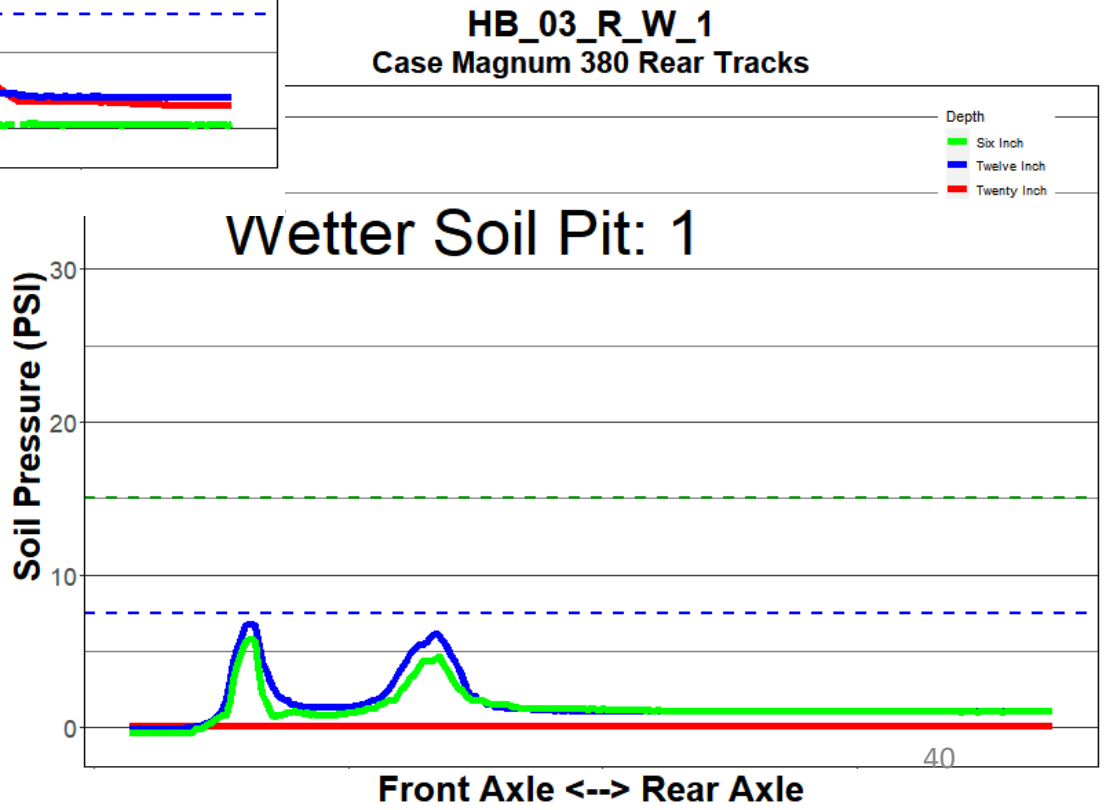
Row Crop Tractor - Tracked

CTIS: Yes / No?


HB_03_R_again_D_1
Case Magnum 380 Rear Tracks
Depth
Six Inch
Twelve Inch
Twenty Inch
Dryer Soil Pit: 1
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_03_R_again_W_1
Case Magnum 380 Rear Tracks
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 1
Soil Pressure (PSI)
30
20
10
0
Front Axle <--> Rear Axle


HB_03_R_D_1
Case Magnum 380 Rear Tracks
Depth
Six Inch
Twelve Inch
Twenty Inch
Dryer Soil Pit: 1
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_03_R_W_1
Case Magnum 380 Rear Tracks
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 1
Soil Pressure (PSI)
30
20
10
0
Front Axle <--> Rear Axle

Plot Comments – HB03

- This unit, as a stand alone tractor, was not heavy so transferred very little stress into the soil.
- Note the view of each bogey wheel of the rear track shows up, where the unit was heavy and the weight distribution was not even across the bogey wheels you can get significant point stress if not properly setup.
- This example shows a bit of spikes on boggy wheel one compared to the others with the 12” probe.


VF650/85R38


CVXDrive


CASE IH
380

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB04 + HB05

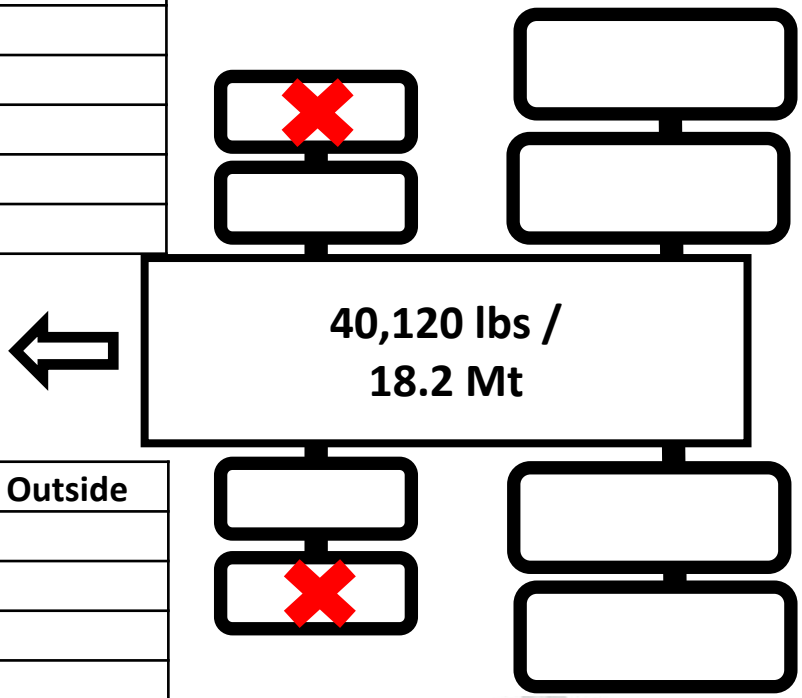
John Deere 8R310 Row Crop Tractor w Dual IF and JD 1910 Air Cart IF and 1890 Air Seeder


JOHN DEERE
8R
310

Exh#:	HB4	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	McBlain	Phone#:
EquipType:	Row Crop Tractor	Make:	John Deere	Model: 8R310

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Axiobib	
Tire Type:	IF	
Tire Size:	650/60 R34	
TireWt (lbs):	6200	
Road PSI:	12	
Field PSI:	12	
OnArrival PSI	12.7	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Axiobib	Axiobib
Tire Type:	IF	IF
Tire Size:	710/75 R42	710/75 R42
TireWt (lbs):	7240	7040
Road PSI:	9	9
Field PSI:	9	9
OnArrival PSI	9	7



INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Axiobib	
Tire Type:	IF	
Tire Size:	650/60 R34	
TireWt (lbs):	6100	
Road PSI:	12	
Field PSI:	12	
OnArrival PSI	12.7	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Axiobib	Axiobib
Tire Type:	IF	IF
Tire Size:	710/75 R42	710/75 R42
TireWt (lbs):	7140	6400
Road PSI:	9	9
Field PSI:	9	9
OnArrival PSI	9	9

Row Crop Tractor - Wheeled

CTIS: Yes / No?


McBlain Farms Ltd.

Exh#:	HB5	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	McBlain	Phone#:
EquipType:		Make:	John Deere	Model: 1910 Cart, 1890 Drill

INFO	Cart Tires		Drill Tires					
Tire/Trk Make:	Firestone		Titan					
Tire Model:	Deep Tread		Multi Trac 12					
Tire Type:	IF		Bias					
Tire Size:	1250/50 R32		31X13.50-15					
TireWt (lbs):								
Road PSI:	9		45					
Field PSI:								
OnArrival PSI								

E = empty and L = loaded

R = road and F = field

Draw Tire Layout and Label Each Tire

11,680 lbs

11,980 lbs

2 Firestone cart tires

1600 lbs | 1280 lbs | 2720 lbs | 2000 lbs | 1980 lbs | 2320 lbs | 1280 lbs | 1600 lbs

16 Titan drill tires

2780 lbs | 3780 lbs | 3560 lbs | 2780 lbs

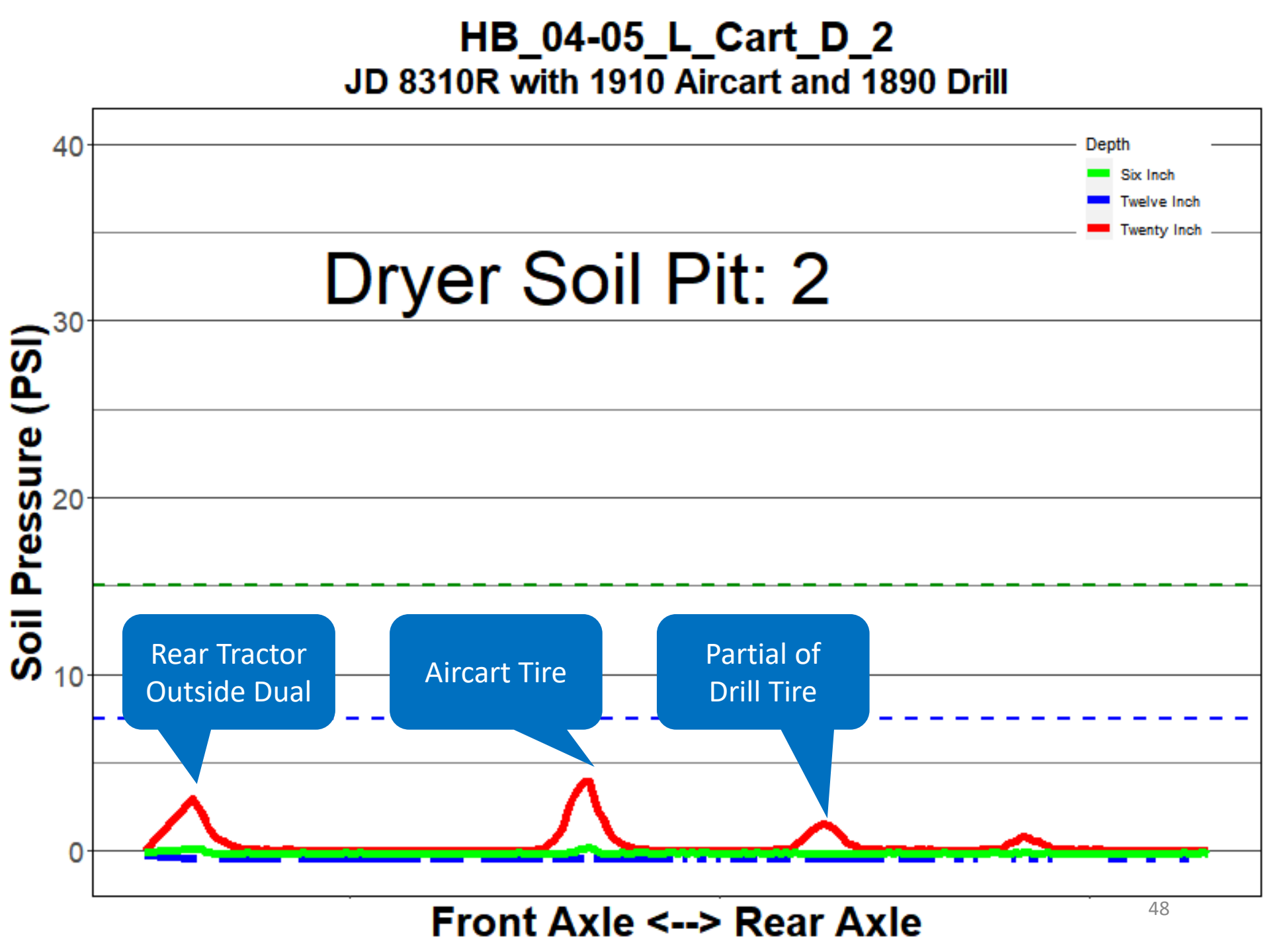
Total: 51,340 lbs / 23.3 Mt

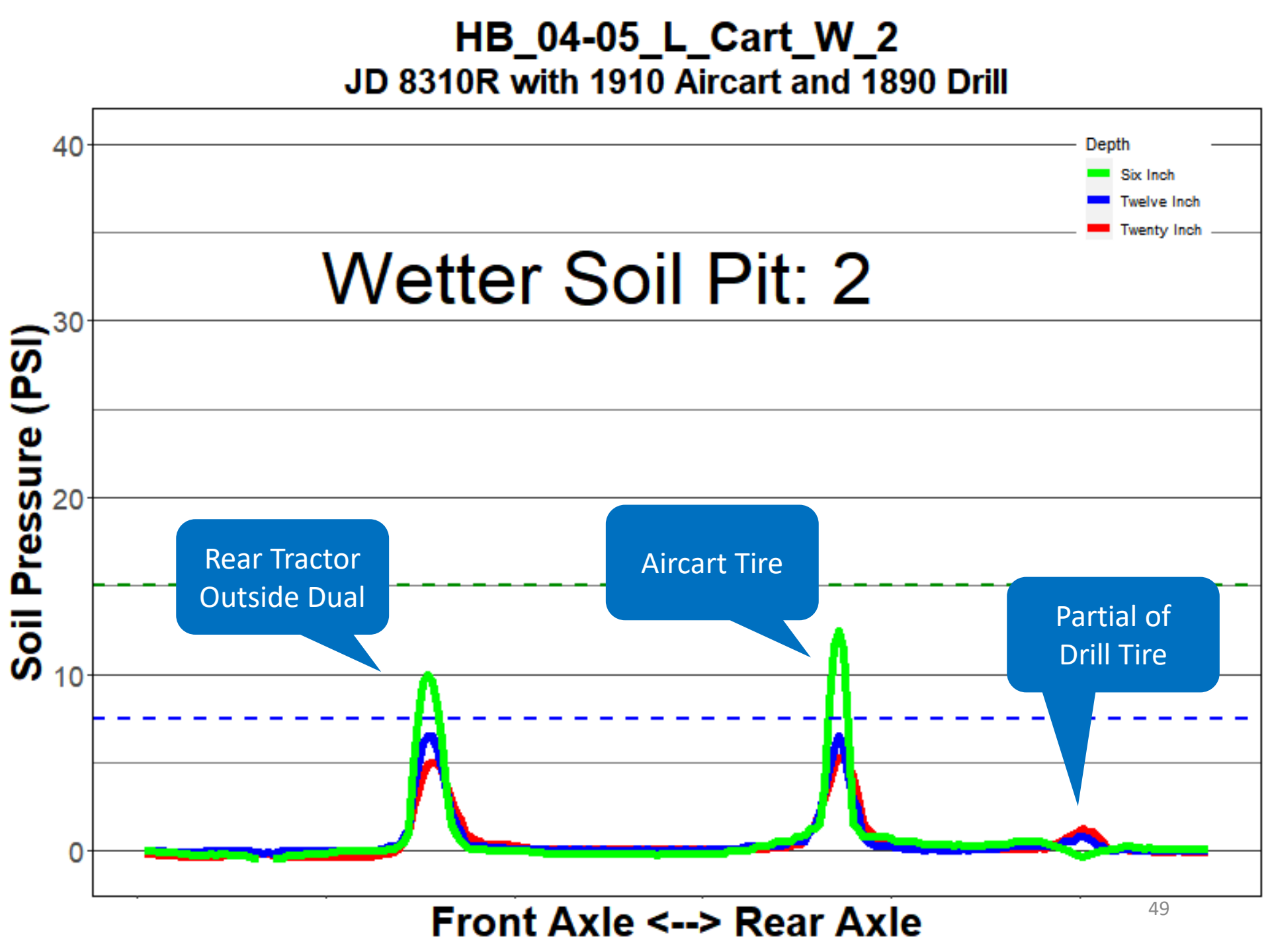
Corn Planter

Empty or Loaded?

Road or Field?

CTIS: Yes / No?


HB_04-05_L_Cart_D_2
JD 8310R with 1910 Aircart and 1890 Drill
Depth
Six Inch
Twelve Inch
Twenty Inch
Dryer Soil Pit: 2
Soil Pressure (PSI)
40
30
20
10
0
Rear Tractor Outside Dual
Aircart Tire
Partial of Drill Tire
Front Axle <--> Rear Axle


HB_04-05_L_Cart_W_2
JD 8310R with 1910 Aircart and 1890 Drill
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 2
Soil Pressure (PSI)
40
30
20
10
0
Rear Tractor Outside Dual
Aircart Tire
Partial of Drill Tire
Front Axle <--> Rear Axle

Plot Comments – HB04+05

- This combination was not well oriented to get all the tractor, cart and drill tires over the sensors making it hard to test and draw conclusions.
- The large tires on the cart transferred little stress into the soil although it did increase in the wet pit.
- The drill tires have higher PSI (45) but the alignment meant we didn’t get the tires over the sensor so we are unsure if they would have created much stress at the sensor depths.
- This was an excellent setup for a planting unit although it was not loaded and so the true impact is not discernable in this case.

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB06 + HB07

Two JD 624 K11 Wheel Loaders with Industrial vs Ag Tires w & w/o Bucket Load

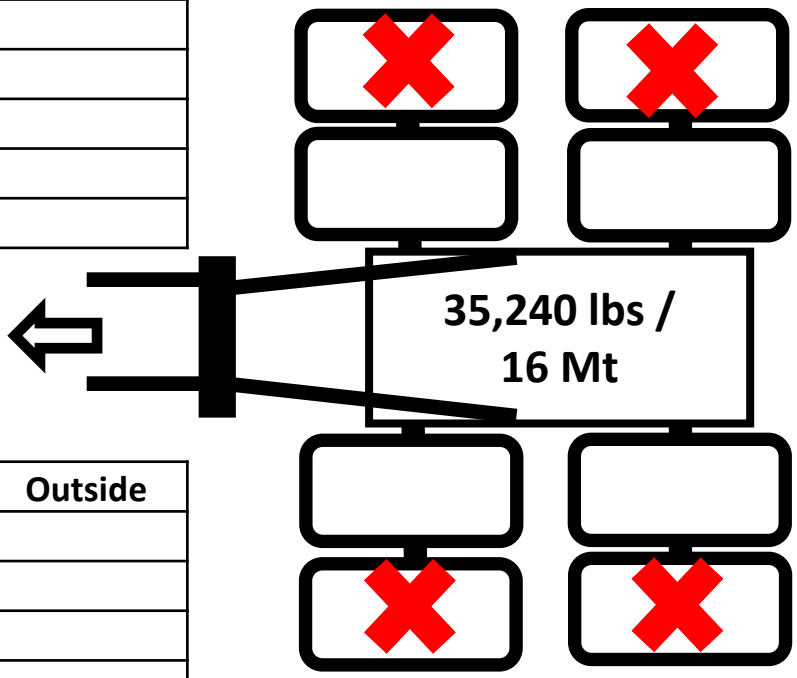

JOHN DEERE
624K-II

Exh#:	HB6	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Stonewater Ag	Phone#:
EquipType:	Wheel Loader	Make:	John Deere	Model: 624K-11

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	7620	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

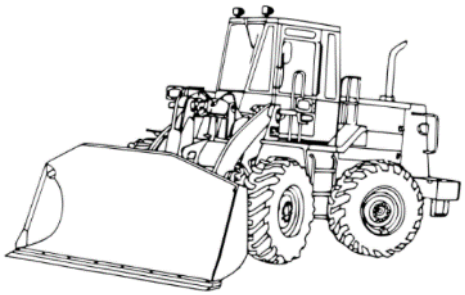
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	10280	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

Not loaded



INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	7200	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	1040	
Road PSI:		
Field PSI:	29	
OnArrival PSI		



Industrial Loader

CTIS: Yes / No?

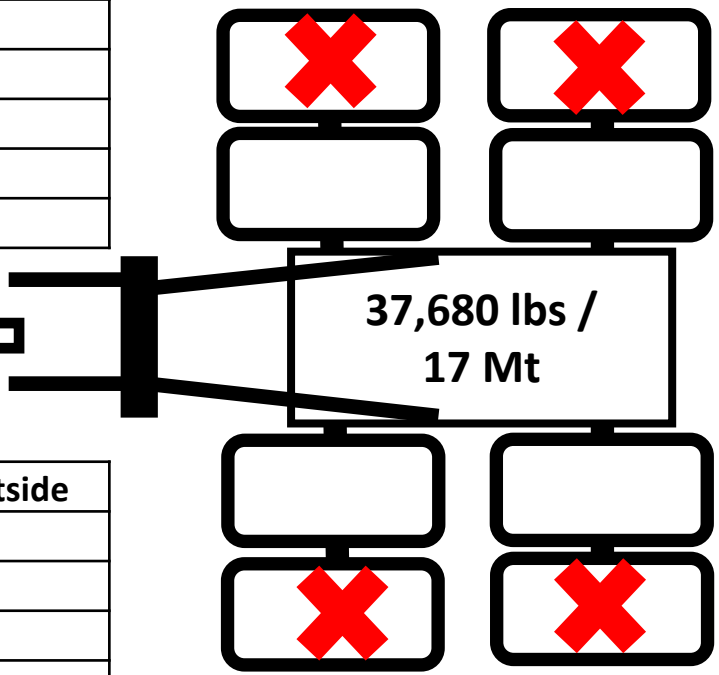

JOHN DEERE

Exh#:	HB6	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:	Stonewater Ag	Phone#:	
EquipType:	Wheel Loader	Make:	John Deere	Model:	624K-11

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	9560	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

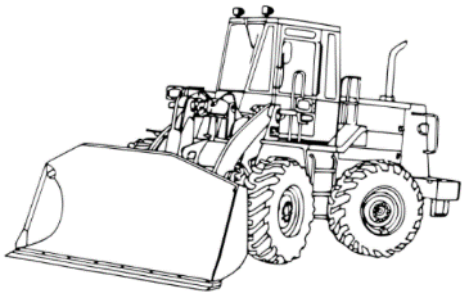
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	9620	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

2160 lb concrete block



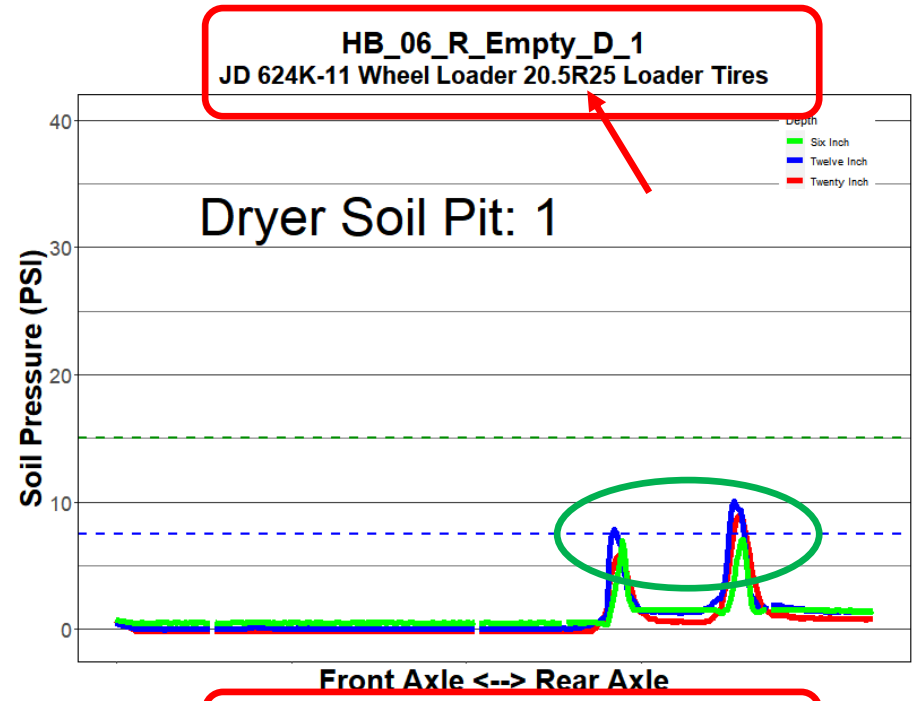
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	8900	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

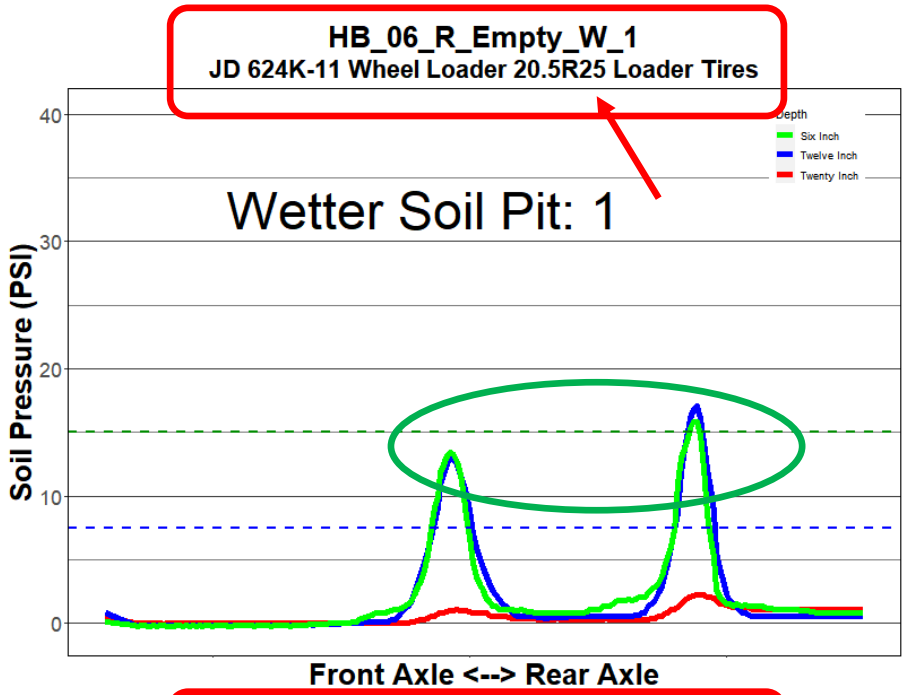
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	XHA 2	
Tire Type:	Radial	
Tire Size:	20.5 R25	
TireWt (lbs):	9600	
Road PSI:		
Field PSI:	29	
OnArrival PSI		

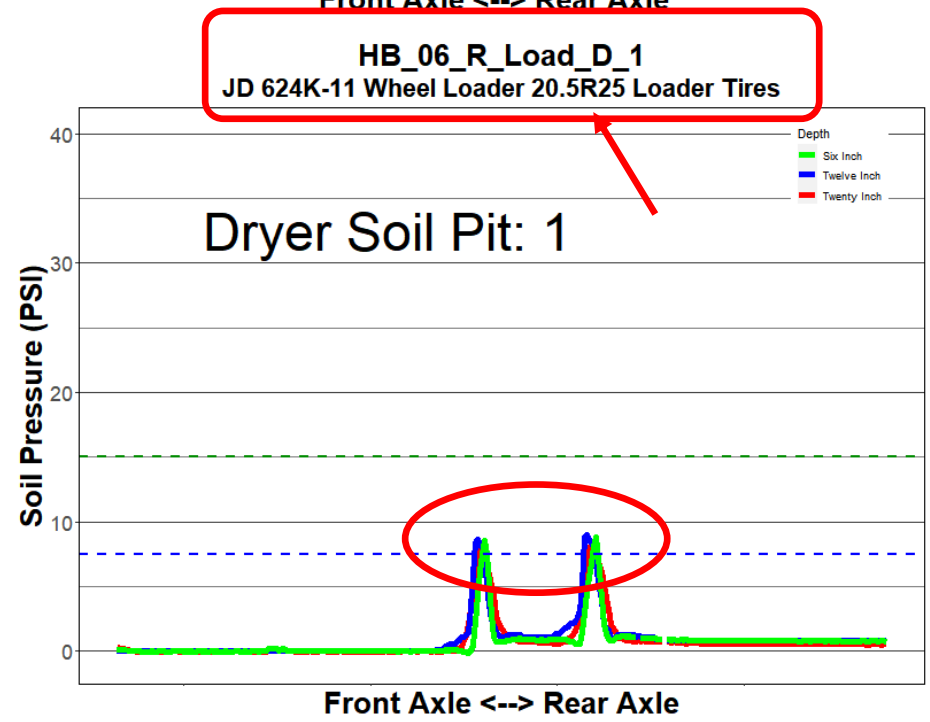


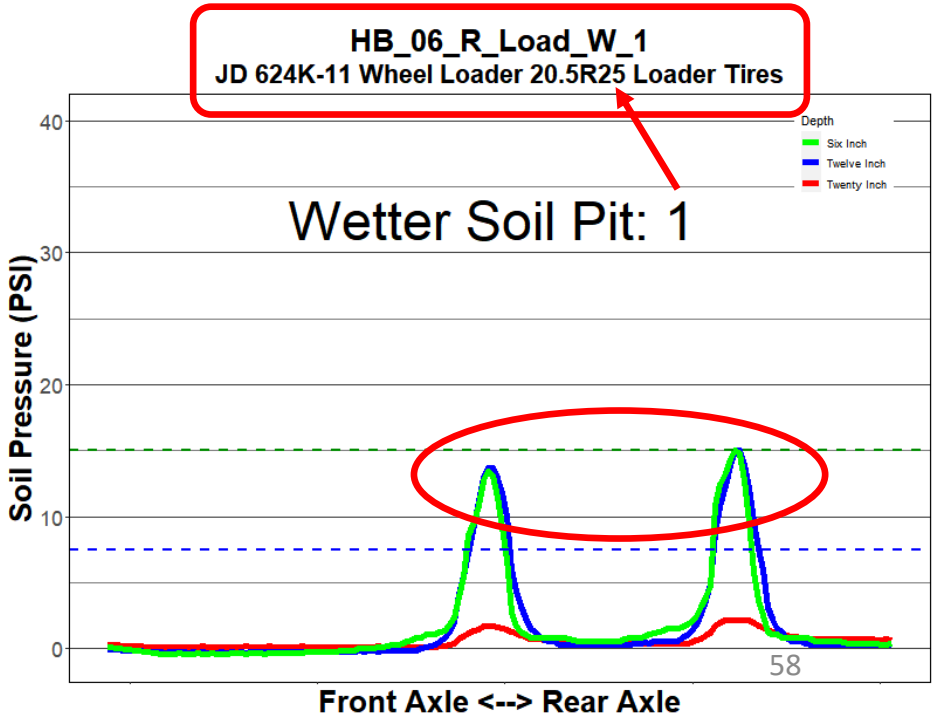
Industrial Loader

CTIS: Yes / No?


HB_06_R_Empty_D_1
JD 624K-11 Wheel Loader 20.5R25 Loader Tires
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_06_R_Empty_W_1
JD 624K-11 Wheel Loader 20.5R25 Loader Tires
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_06_R_Load_D_1
JD 624K-11 Wheel Loader 20.5R25 Loader Tires
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_06_R_Load_W_1
JD 624K-11 Wheel Loader 20.5R25 Loader Tires
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle

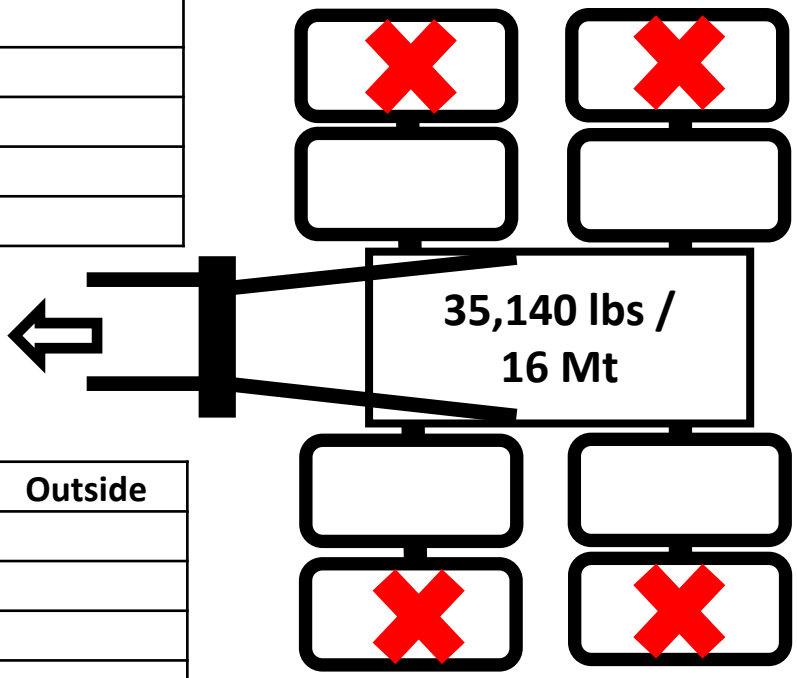

JOHN DEERE
624K-II
CASE IH

Exh#:	HB7	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:	Stonewater Ag	Phone#:	
EquipType:	Wheel loader B		Make: John Deere	Model:	624K-11

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	8420	
Road PSI:	35	
Field PSI:	15	
OnArrival PSI	35.3	

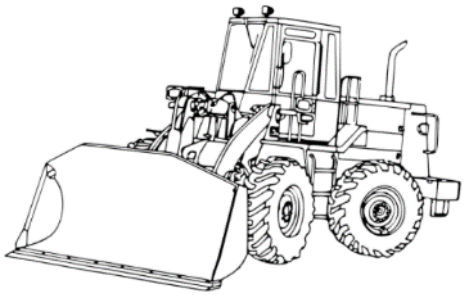
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	9680	
Road PSI:	39	
Field PSI:	15	
OnArrival PSI	33.9	

Not loaded



INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	7300	
Road PSI:	35	
Field PSI:	15	
OnArrival PSI	33.6	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	9740	
Road PSI:	39	
Field PSI:	15	
OnArrival PSI	31.8	



Industrial Loader

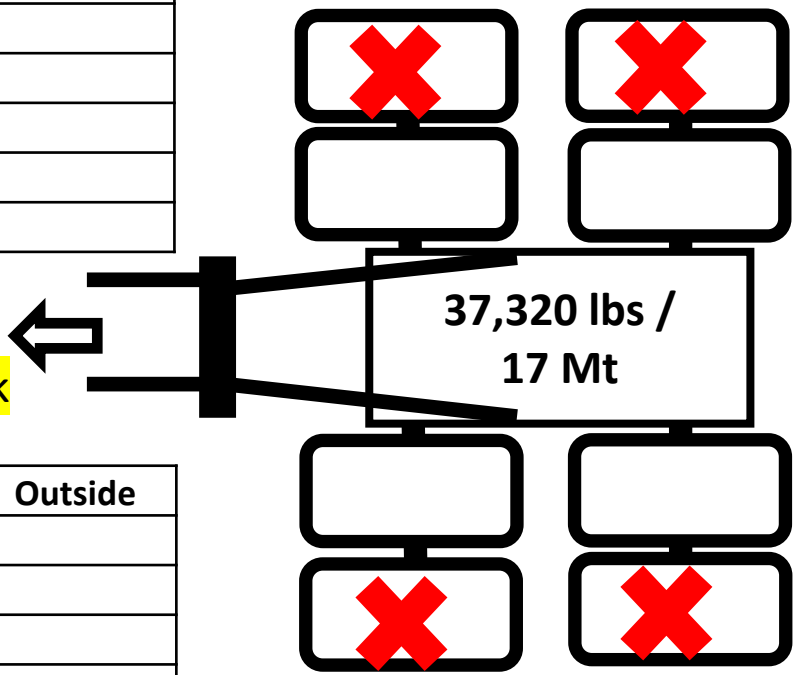
CTIS: Yes/ No?

Exh#:	HB7	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:	Stonewater Ag	Phone#:	
EquipType:	Wheel loader B		Make: John Deere	Model:	624K-11

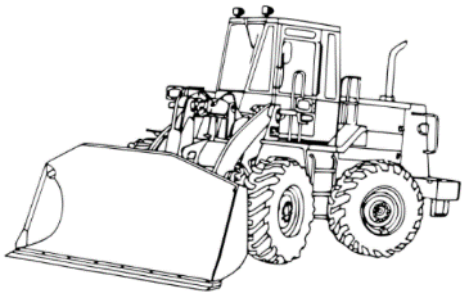
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	9100	
Road PSI:	35	
Field PSI:	15	
OnArrival PSI	35.3	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	9120	
Road PSI:	39	
Field PSI:	15	
OnArrival PSI	33.9	

2160 lb concrete block



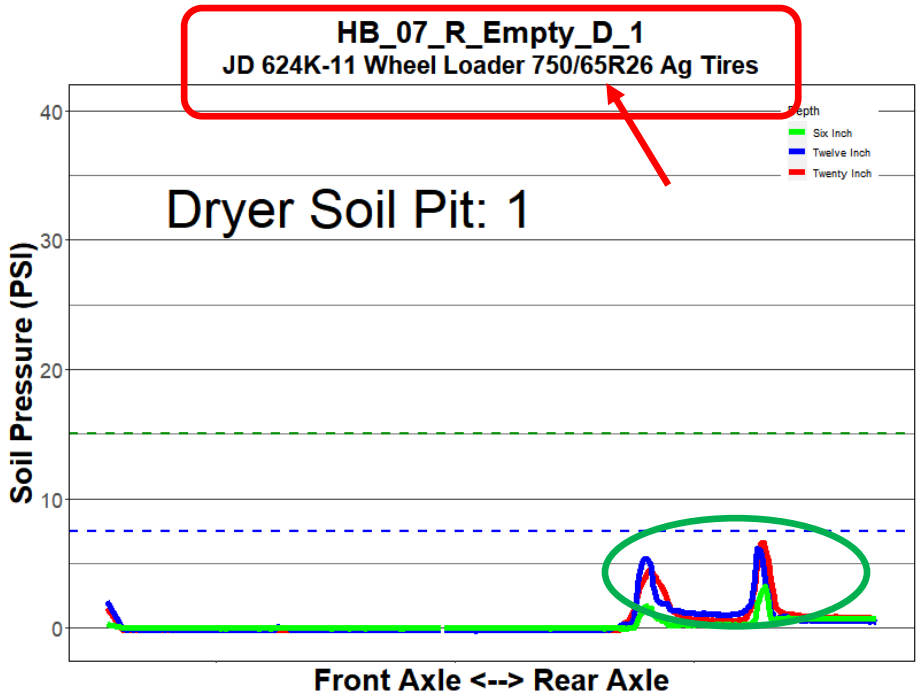
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	10,100	
Road PSI:	35	
Field PSI:	15	
OnArrival PSI	33.6	

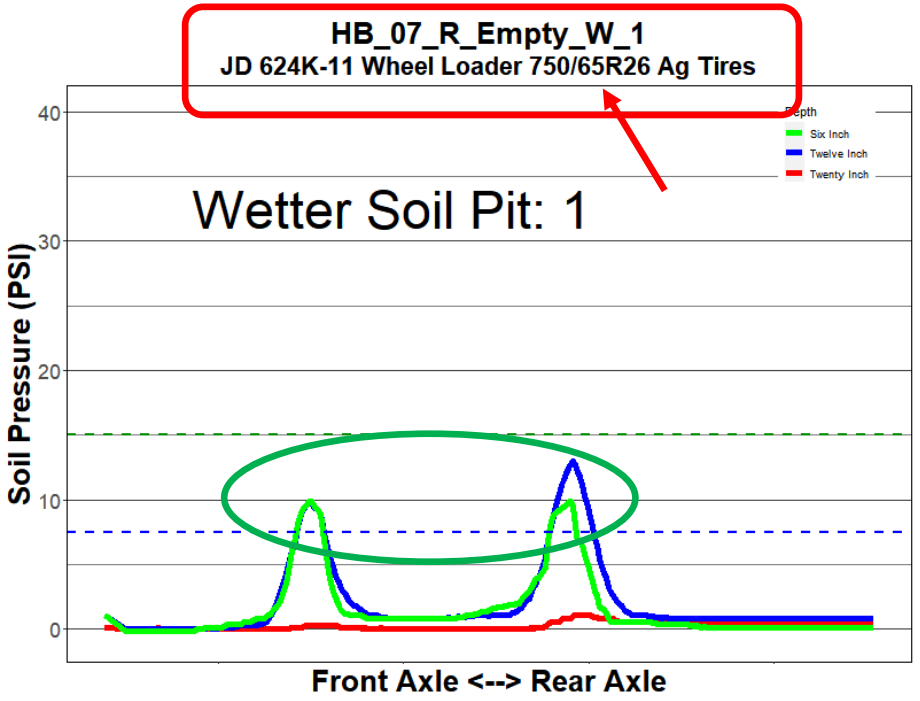


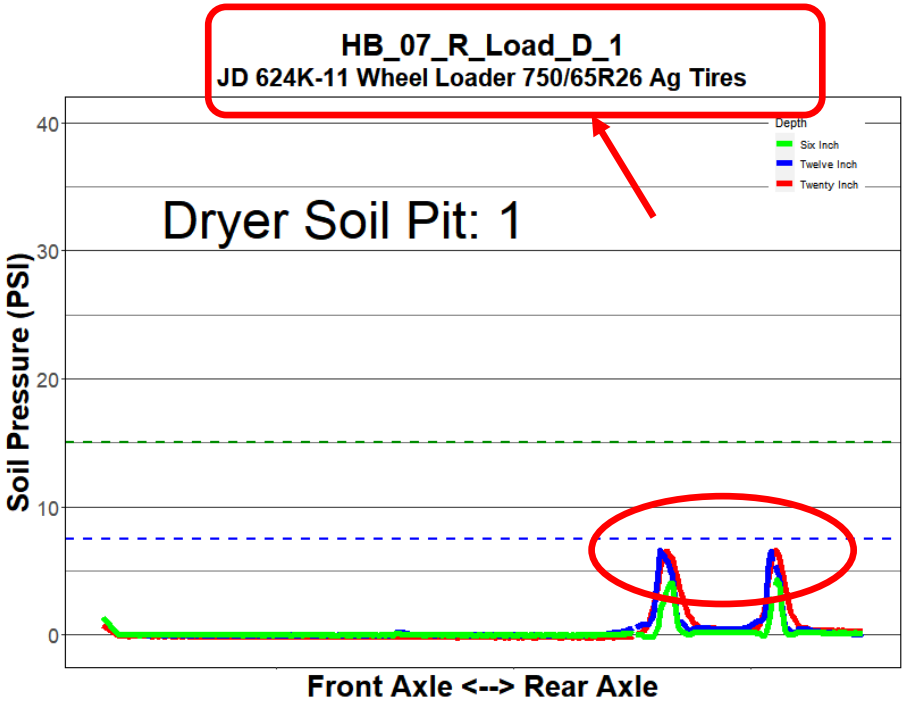
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MegaXbib	
Tire Type:		
Tire Size:	750/65 R26	
TireWt (lbs):	9000	
Road PSI:	39	
Field PSI:	15	
OnArrival PSI	31.8	

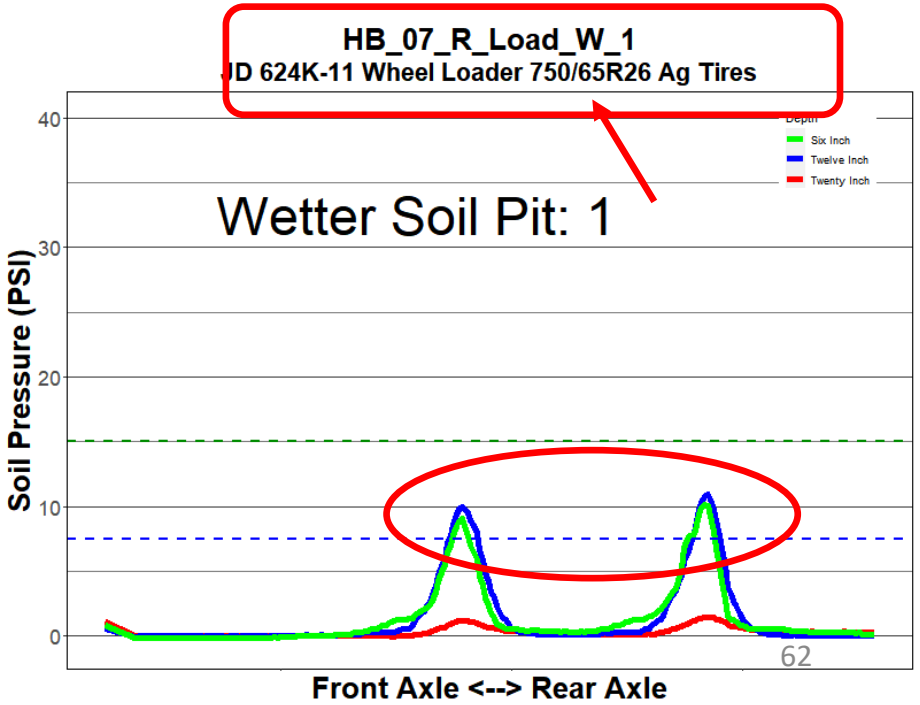
Industrial Loader

CTIS: Yes / No?


HB_07_R_Empty_D_1
JD 624K-11 Wheel Loader 750/65R26 Ag Tires
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_07_R_Empty_W_1
JD 624K-11 Wheel Loader 750/65R26 Ag Tires
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_07_R_Load_D_1
JD 624K-11 Wheel Loader 750/65R26 Ag Tires
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle


HB_07_R_Load_W_1
JD 624K-11 Wheel Loader 750/65R26 Ag Tires
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
0
10
20
30
40
Front Axle <--> Rear Axle

Plot Comments – HB06 + HB07

- Industrial vs Ag tire essentially no difference but small reduction for ag tire.
- While loaded vs not loaded, there was not much difference in the response observed.
- Again, dryer soil was more resistant to stress transference into the soil vs wet soil.


624K


JOHN DEERE

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB08 + HB09

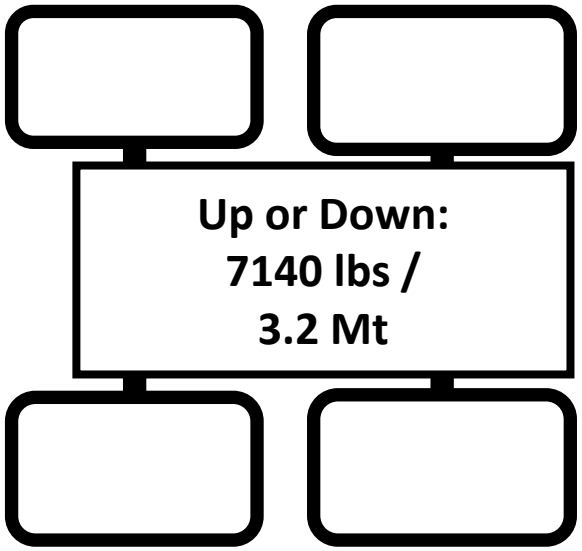
Case 75XT Wheeled vs Kubota SVL 95-2s Tracked Skidsteer Loaders

Exh#:	HB8	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Davis	Phone#:
EquipType:	Skidsteer with tires	Make:	CASE IH	Model: 75XT

INFO	Fork up	Fork down
Tire/Trk Make:	Bossman Grip	Bossman Grip
Tire Model:		
Tire Type:	Bias	Bias
Tire Size:	10-16-5	10-16-5
TireWt (lbs):	600/2000	1300/2100
Road PSI:		
Field PSI:		
OnArrival PSI		

INFO	Fork up	Fork down
Tire/Trk Make:	Bossman Grip	Bossman Grip
Tire Model:		
Tire Type:	Bias	Bias
Tire Size:	10-16-5	10-16-5
TireWt (lbs):	3120/2440	2200/2340
Road PSI:		
Field PSI:		
OnArrival PSI		

Loaded with 2 bales ⇦



INFO	Fork up	Fork down
Tire/Trk Make:	Bossman Grip	Bossman Grip
Tire Model:		
Tire Type:	Bias	Bias
Tire Size:	10-16-5	10-16-5
TireWt (lbs):	1200/2600	500/2700
Road PSI:		
Field PSI:		
OnArrival PSI		

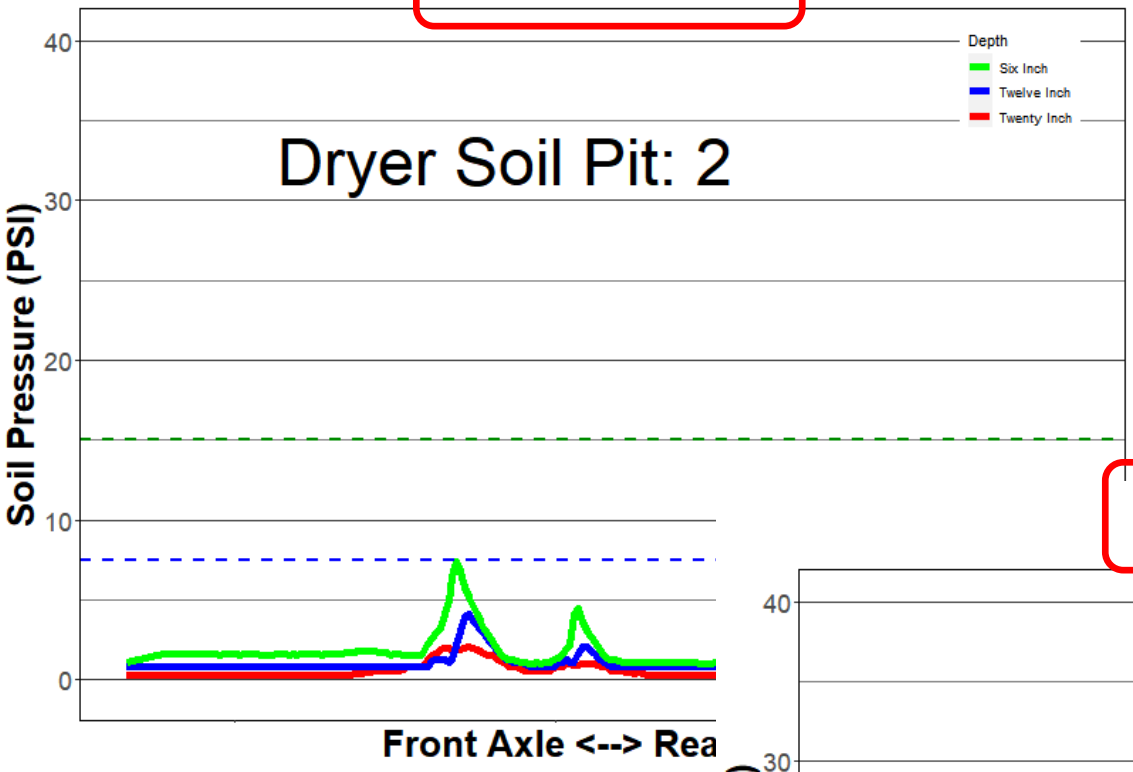
INFO	Fork up	Fork down
Tire/Trk Make:	Bossman Grip	Bossman Grip
Tire Model:		
Tire Type:	Bias	Bias
Tire Size:	10-16-5	10-16-5
TireWt (lbs):	2220/1520	3120/1420
Road PSI:		
Field PSI:		
OnArrival PSI		

Skid Steer - Wheeled

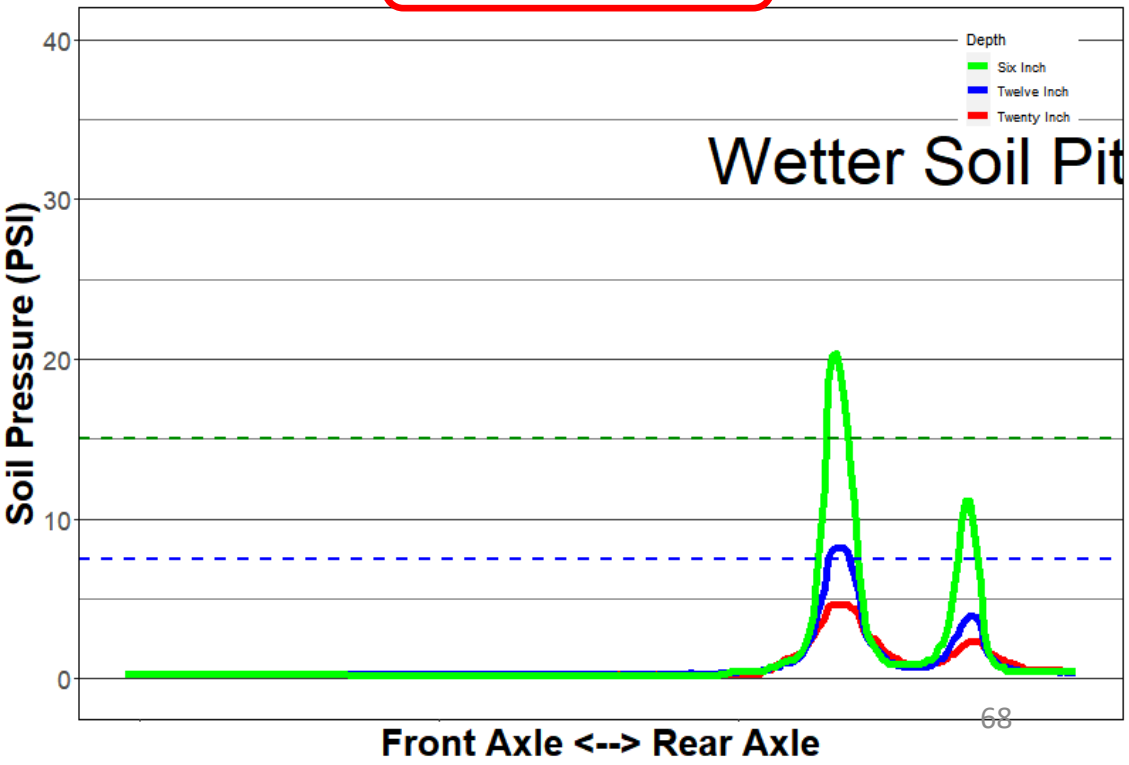
Empty or Loaded?

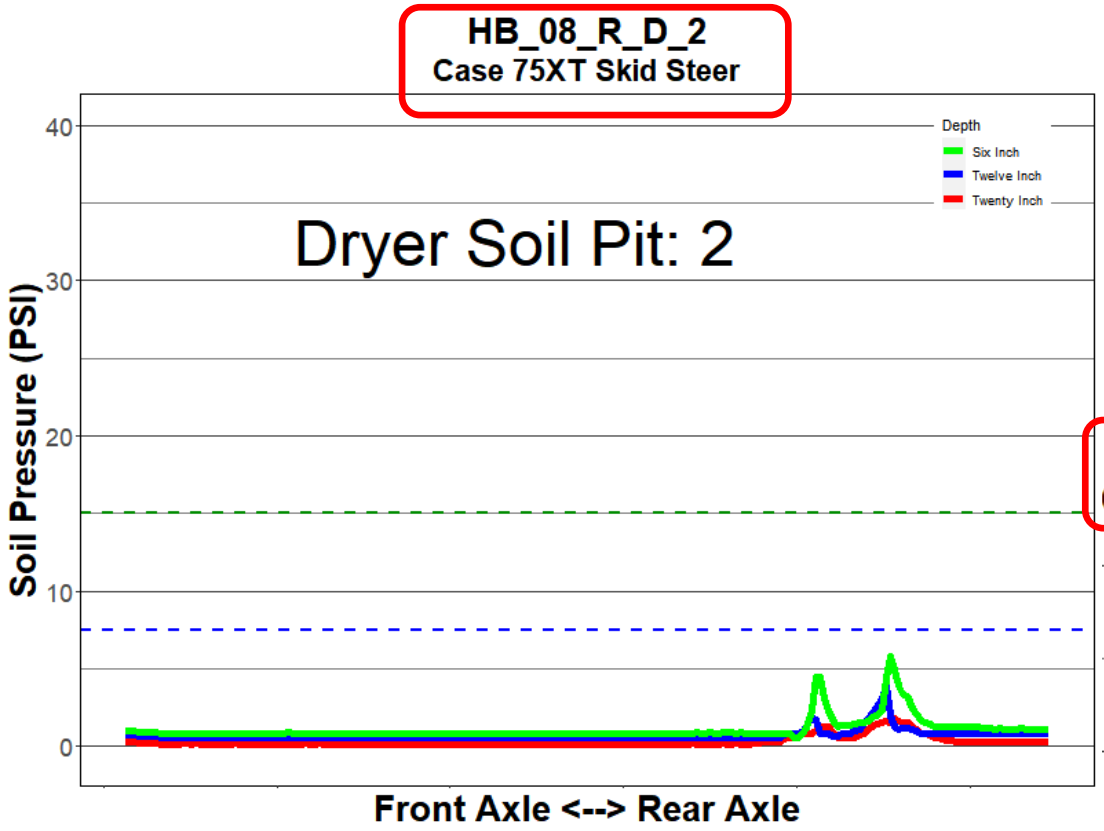
CTIS: Yes / No?

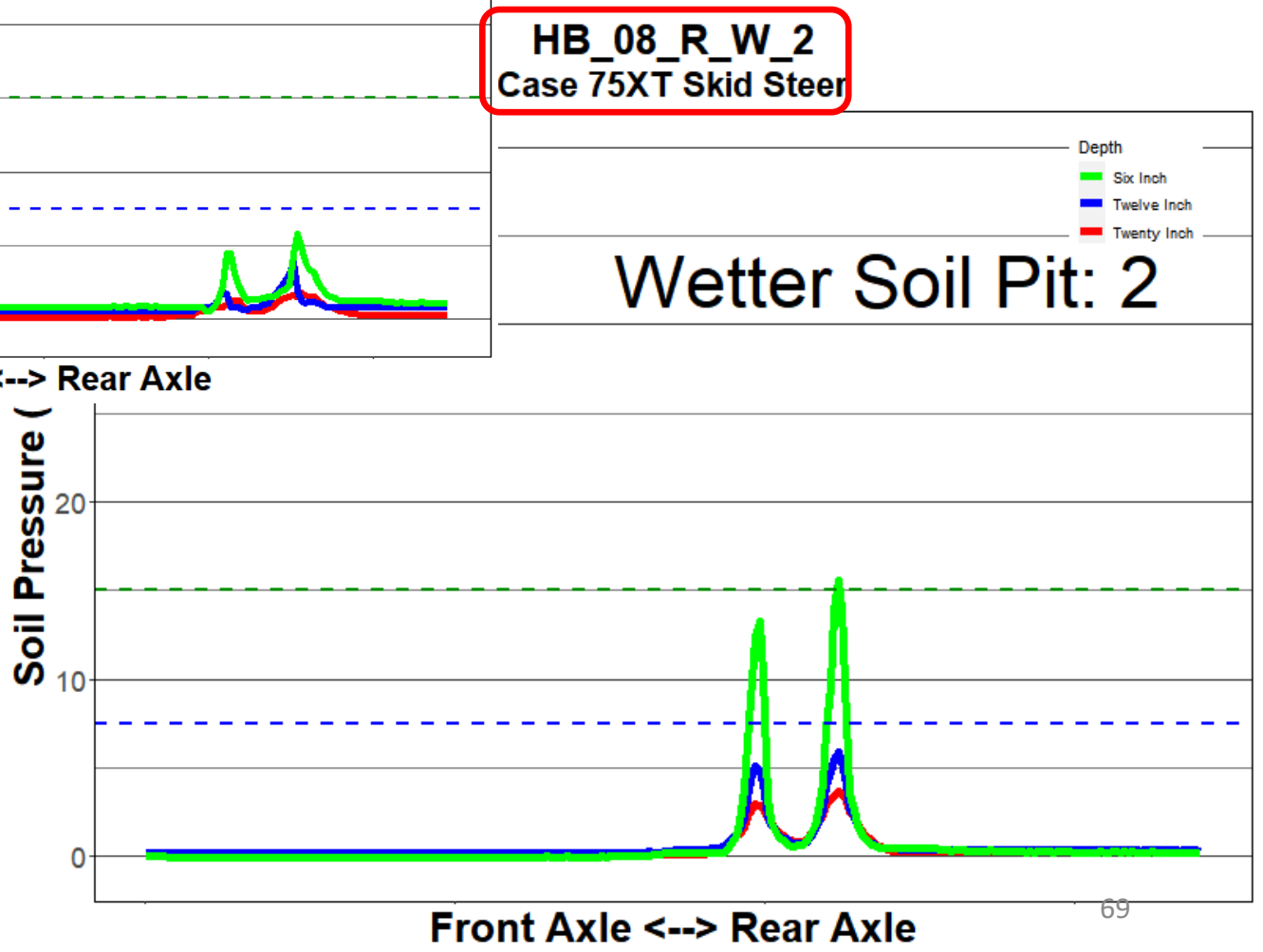
HB_08_L_D_2
Case 75XT Skid Steer



HB_08_L_W_2
Case 75XT Skid Steer




HB_08_R_D_2
Case 75XT Skid Steer
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_08_R_W_2
Case 75XT Skid Steer
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (
20
10
0
Front Axle <--> Rear Axle

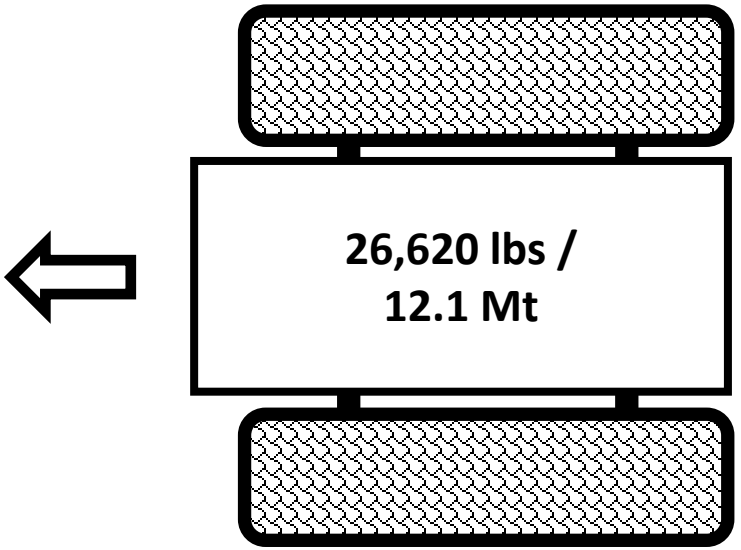

KUBOTA
SVL
95-2s

Exh#:	HB9	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:		Phone#:	
EquipType:	Skidsteer	Make:	Kubota	Model:	SVL 95-2s

INFO	Load up	Load down
Tire/Trk Make:	Canso	Canso
Tire Model:	Rotation	Rotation
Tire Type:	Track	Track
Tire Size:	SD 450X66X58	SD 450X66X58
TireWt (lbs):	6620	6700
Road PSI:		
Field PSI:		

Loaded with 2 bales

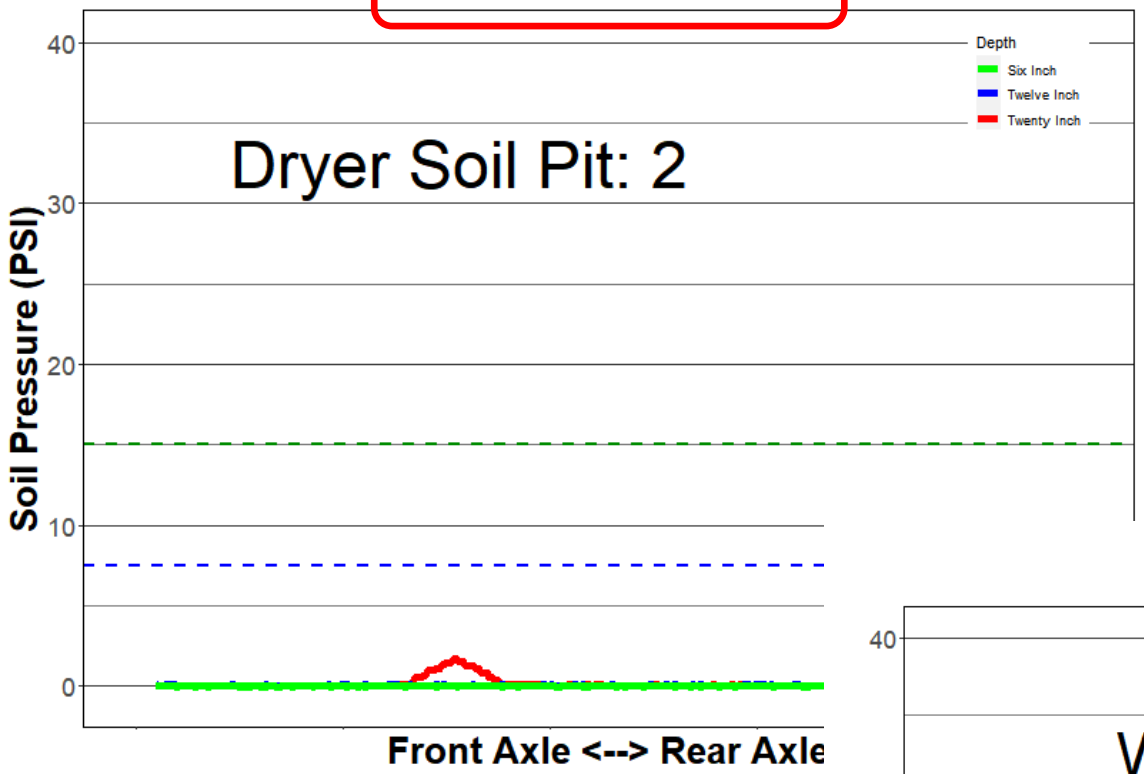
INFO	Load up	Load down
Tire/Trk Make:	Canso	Canso
Tire Model:	Rotation	Rotation
Tire Type:	Track	Track
Tire Size:	SD 450X66X58	SD 450X66X58
TireWt (lbs):	6700	6600
Road PSI:		
Field PSI:		



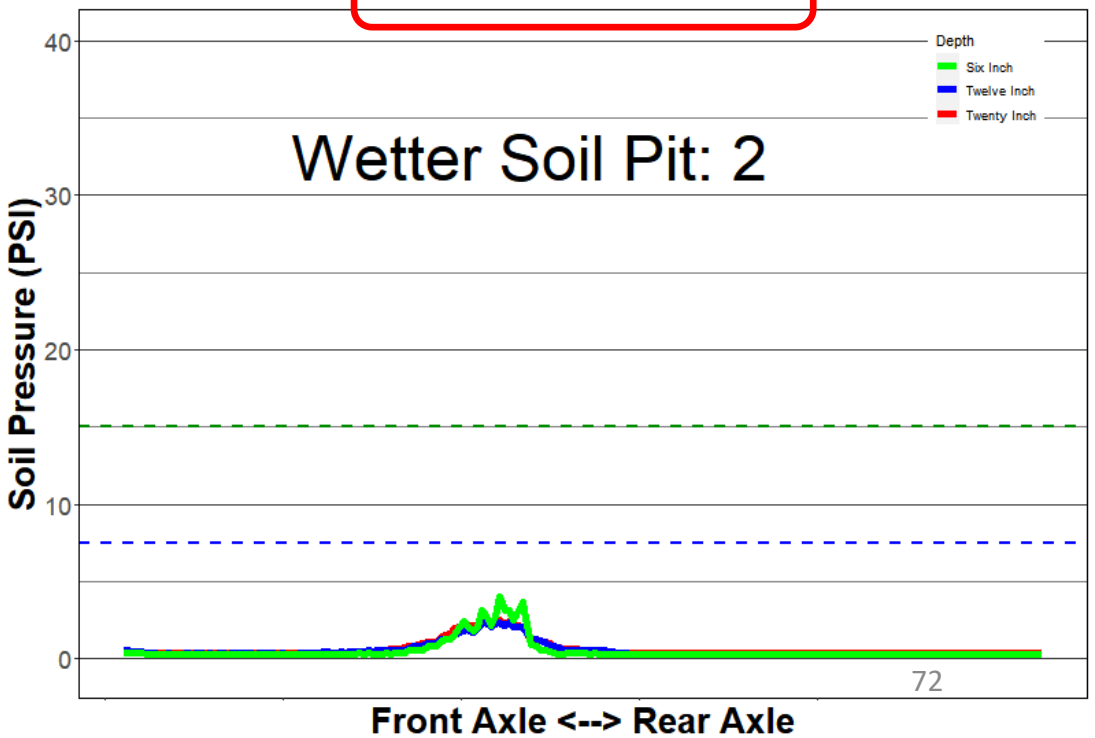
Empty or Loaded?

Skid Steer - Tracked

HB_09_R_D_2
Kubota SVL-95-2S Skid Steer



HB_09_R_W_2
Kubota SVL-95-2S Skid Steer



Data Comments – HB08 + HB09

- The wheeled machine was tested carrying the load on the Left Side tires (HB_08_L_D_2, HB_08_L_W_2).
- The machine was tested without a load for the Right Side tires (HB_08_R_D_2,HB_08_R_W_2).
- The wheeled machine had significantly higher loads than the tracks.
- This magnitude of load for this size of track carries weight well.


KUBOTA
SVL
95-2s


KUBOTA
SVL
95-2s

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB11 + HB12 John Deere 6430 Row Crop Loader Tractor and Large Square Hay Bale Wagon

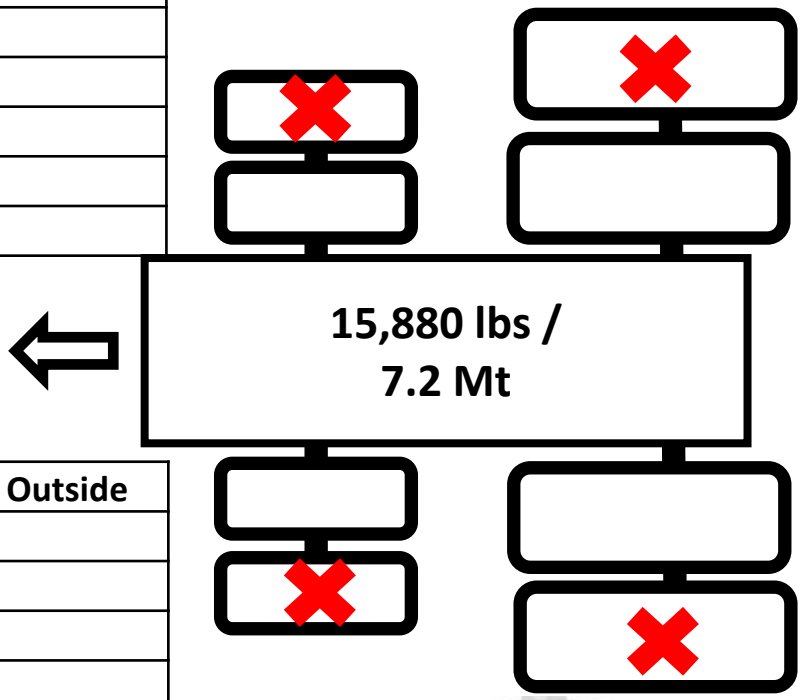

JOHN DEERE
6430
Self-Levelling

Exh#:	HB11	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Sickle	Phone#:
EquipType:	Row Crop Tractor with Loader	Make:	John Deere	Model: 6430

INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Agrimax	
Tire Type:		
Tire Size:	380/70 R28	
TireWt (lbs):	5060	
Road PSI:		
Field PSI:	23	
OnArrival PSI		

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	All traction	
Tire Type:	Radial	
Tire Size:	480/80 R38	
TireWt (lbs):	3060	
Road PSI:		
Field PSI:	6	
OnArrival PSI		

2 bales



INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Agrimax	
Tire Type:		
Tire Size:	380/70 R28	
TireWt (lbs):	4860	
Road PSI:		
Field PSI:	23	
OnArrival PSI		

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	All traction	
Tire Type:	Radial	
Tire Size:	480/80 R38	
TireWt (lbs):	2900	
Road PSI:		
Field PSI:	6	
OnArrival PSI		

Row Crop Tractor - Wheeled

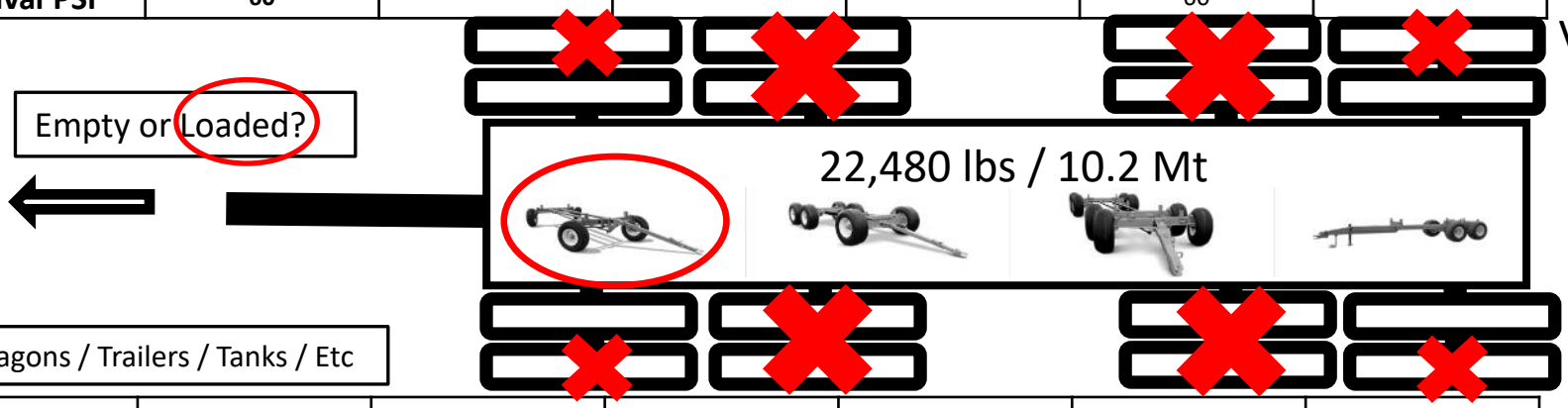
CTIS: Yes / No?


HB11
HB28

Exh#:	HB12	ExhNote:				AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:	Sickle			Phone#:	
EquipType:	Bale Wagon			Make:	Horst	Model:	

INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Michelin				Michelin	
Tire Model:	X One Line Energy				X One Line Energy	
Tire Type:						
Tire Size:	445/50 R22.5				445/50 R22.5	
TireWt (lbs):	5500				5600	
Road PSI:	70				30	
Field PSI:						
OnArrival PSI	60				60	

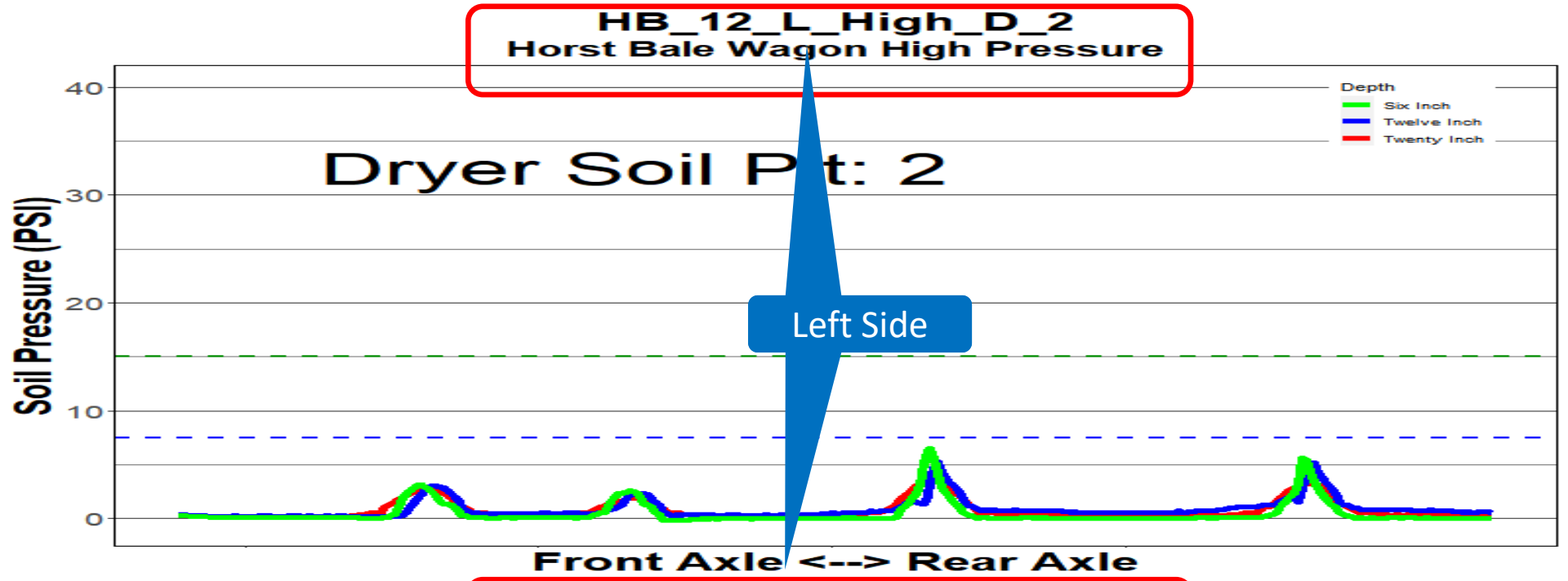
Back tire p
at 30 psi a
VF tires

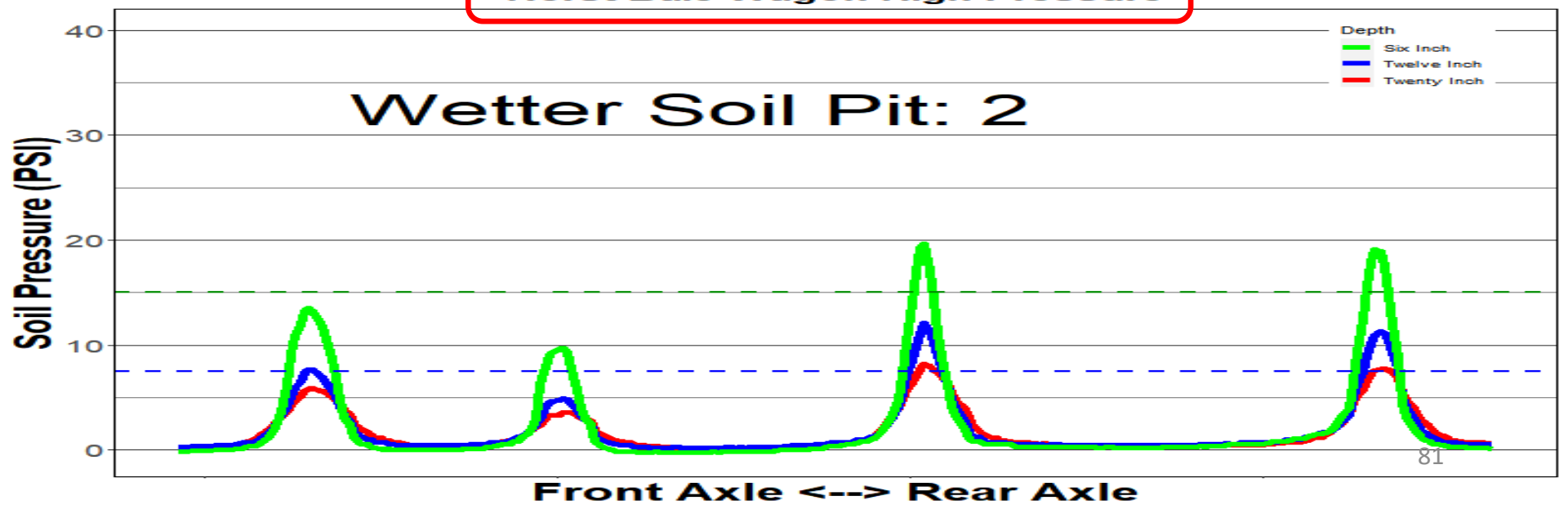


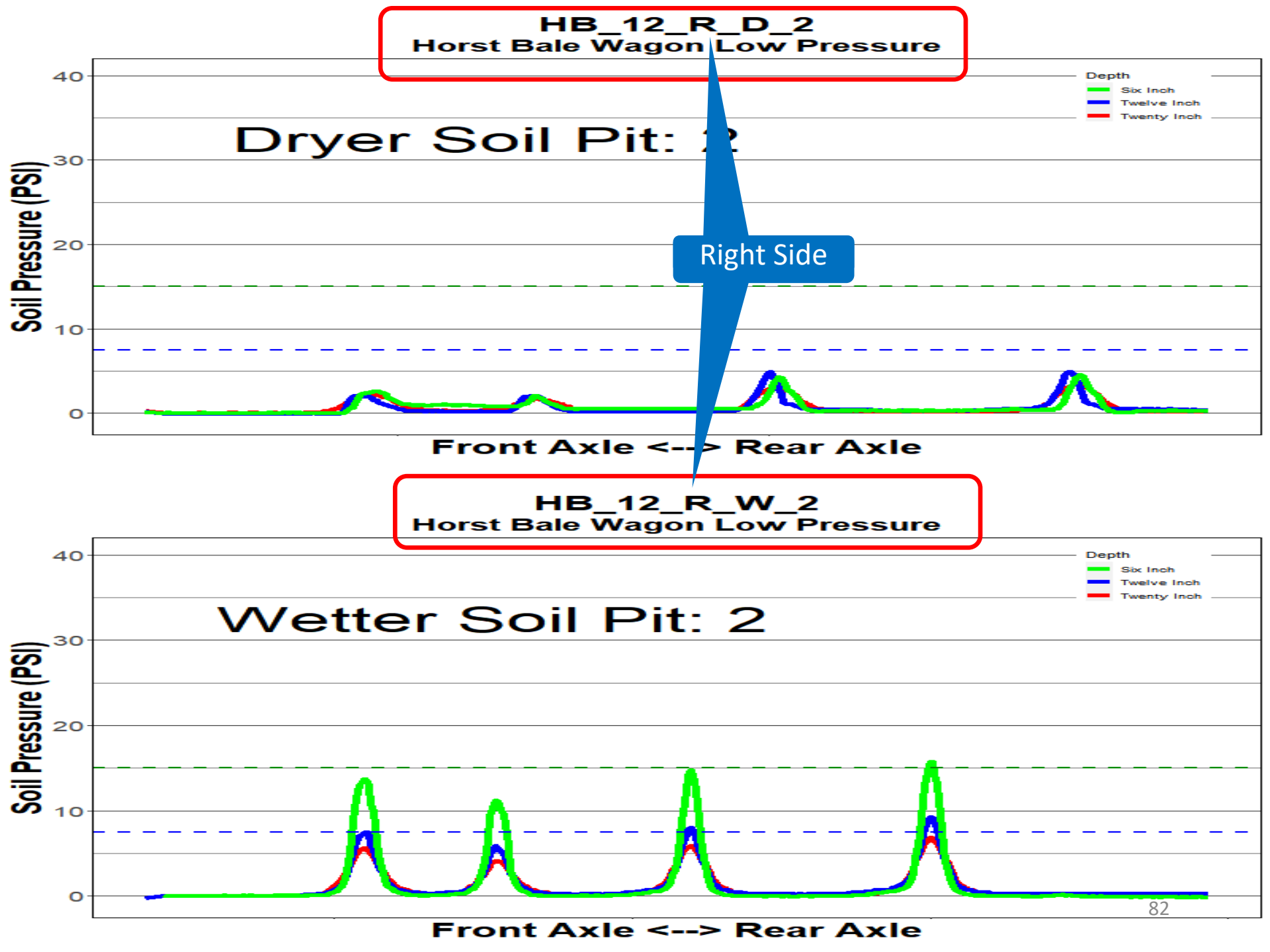
CTIS:
Yes /
No

Large Wagons / Trailers / Tanks / Etc

INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Michelin				Michelin	
Tire Model:	X One Line Energy				X One Line Energy	
Tire Type:						
Tire Size:	445/50 R22.5				445/50 R22.5	
TireWt (lbs):	5780				5600	
Road PSI:	70				30	
Field PSI:						
OnArrival PSI:	60				60	


HB_12_L_High_D_2
Horst Bale Wagon High Pressure
Dryer Soil Pit: 2
Left Side
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_12_L_High_W_2
Horst Bale Wagon High Pressure
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_12_R_D_2
Horst Bale Wagon Low Pressure
Dryer Soil Pit: 2
Right Side
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle
HB_12_R_W_2
Horst Bale Wagon Low Pressure
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB11 + HB12

- Wagons with Small or medium, high pressure tires are not suited for field use despite their history there.
- Even with the reduced tire pressure, this unit is still likely not suited for field use when conditions are wetter.
- Hay is becoming big capacity, big weight business and haying equipment of all types needs to account for this in tire choice.
- Large highway Bias ag tires requiring high PSI should be avoided in favour of wider, larger radial ag tires that have the capacity for these big weights at much lower tire pressure.

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB14
New Holland 195 Dry Manure Box Spreader w Radial vs Bias Tires


JOHN DEERE
New Holland


New Holland
195
JOHN DEERE
CEAT

Exh#:	HB14	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:	Vanderlip	Phone#:	
EquipType:	Manure Spreader		Make: New Holland	Model:	195

INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	CEAT	CEAT				
Tire Model:	Floatmax FT	Floatmax FT				
Tire Type:	Radial	Radial				
Tire Size:	560/45 R22.5	560/45 R22.5				
TireWt (lbs):	3960	4200				
Road PSI:	17	17				
Field PSI:	17	17				
OnArrival PSI	43	43				

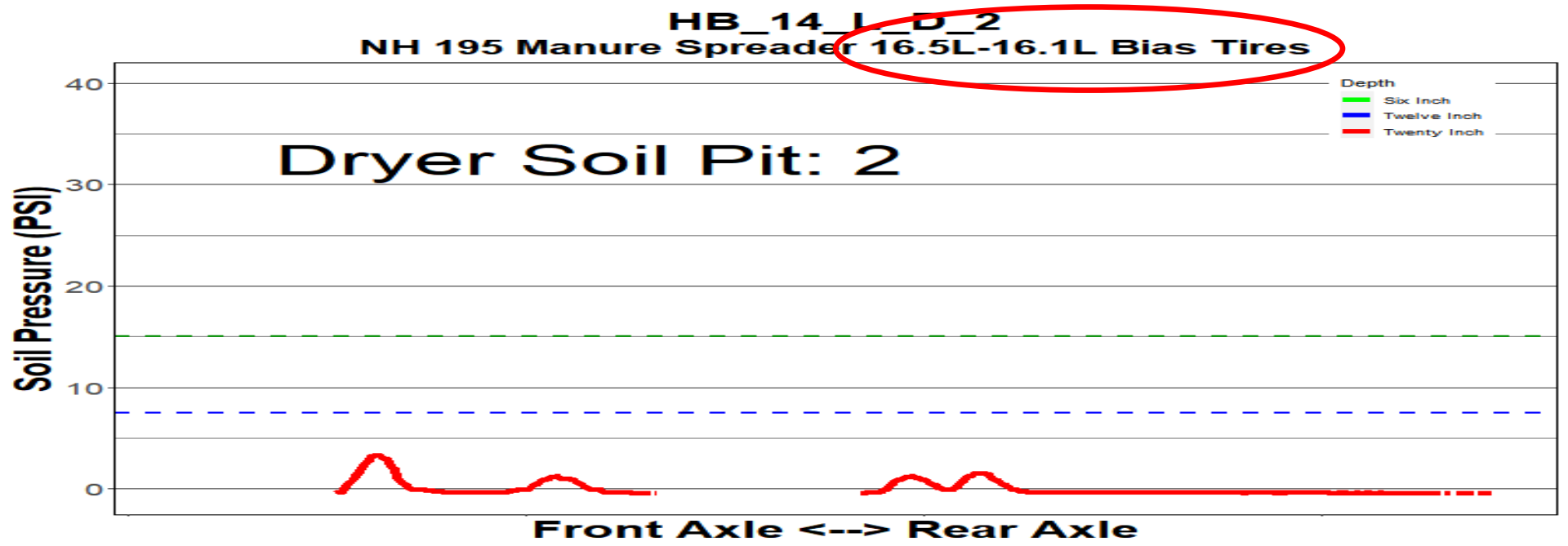
Empty or Loaded?

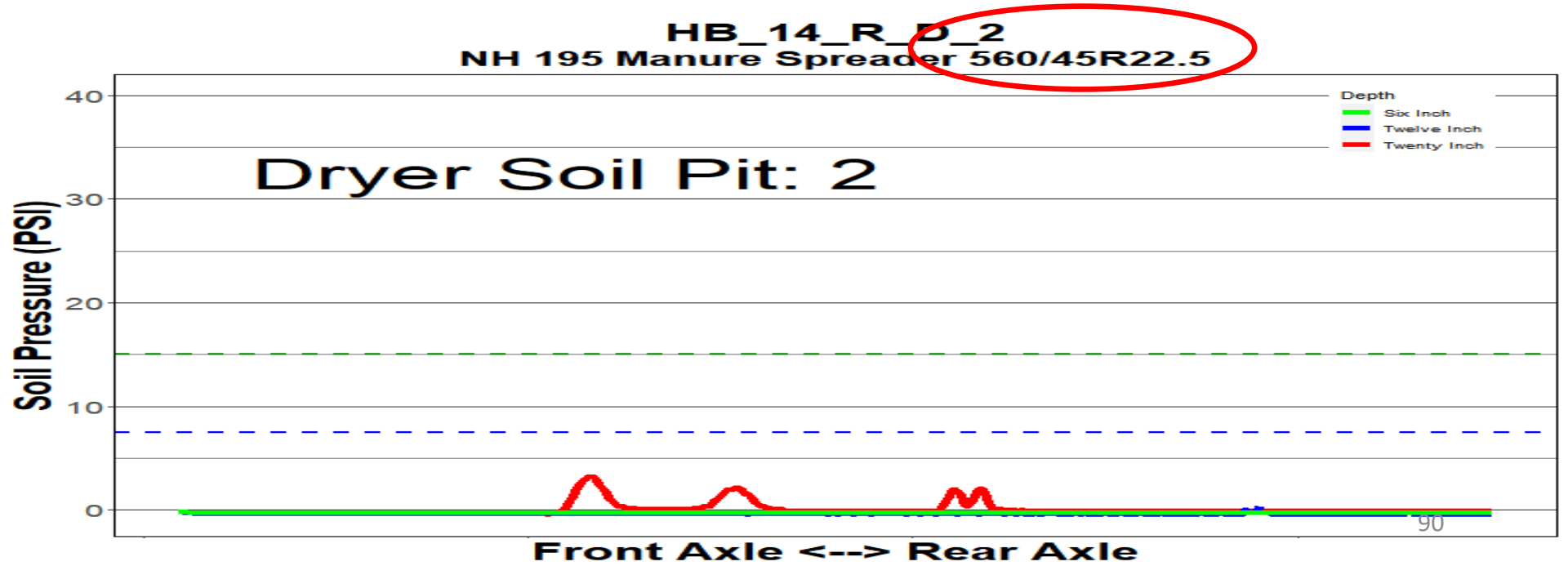
16,020 lbs / 7.3 Mt

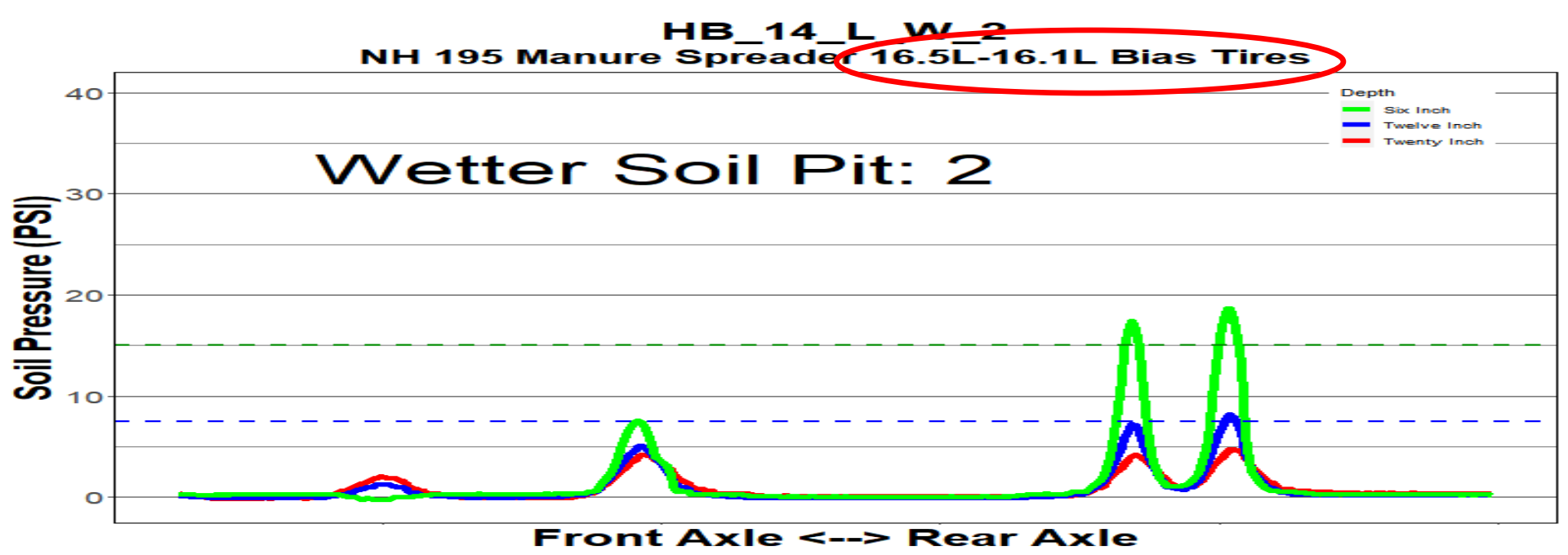
CTIS: Yes

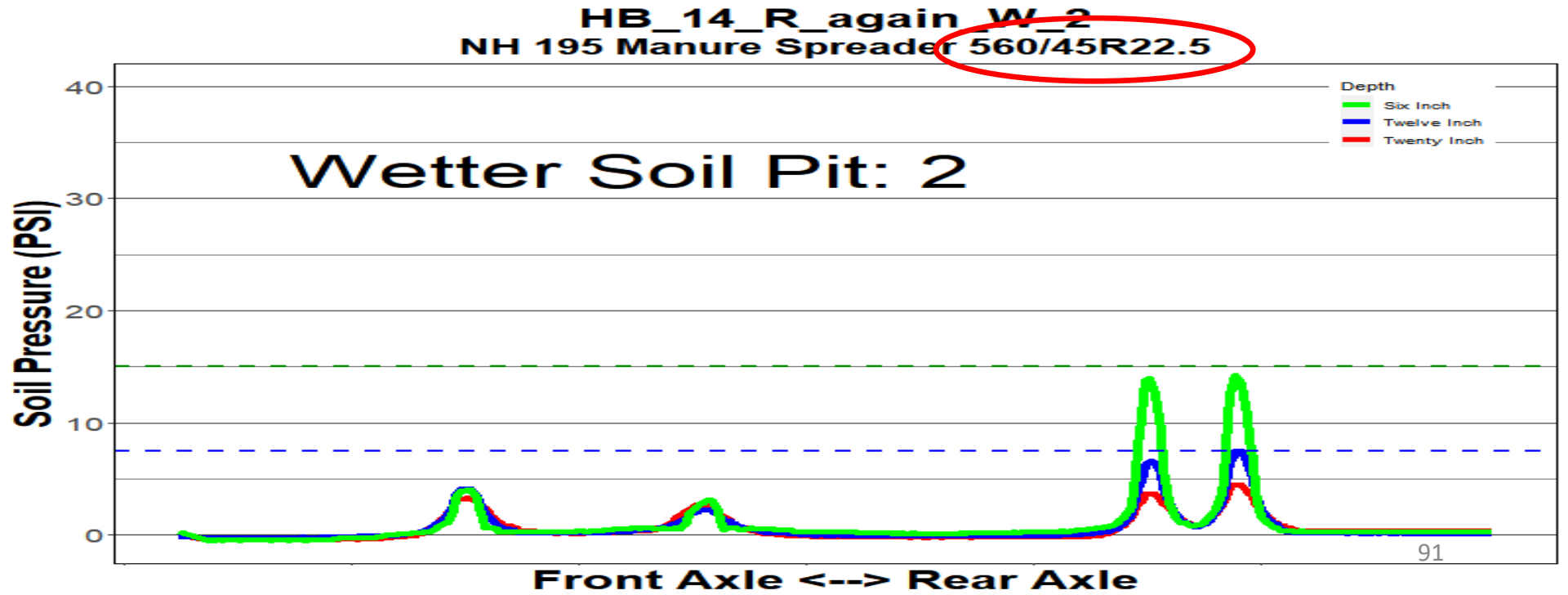
Large Wagons / Trailers / Tanks / Etc

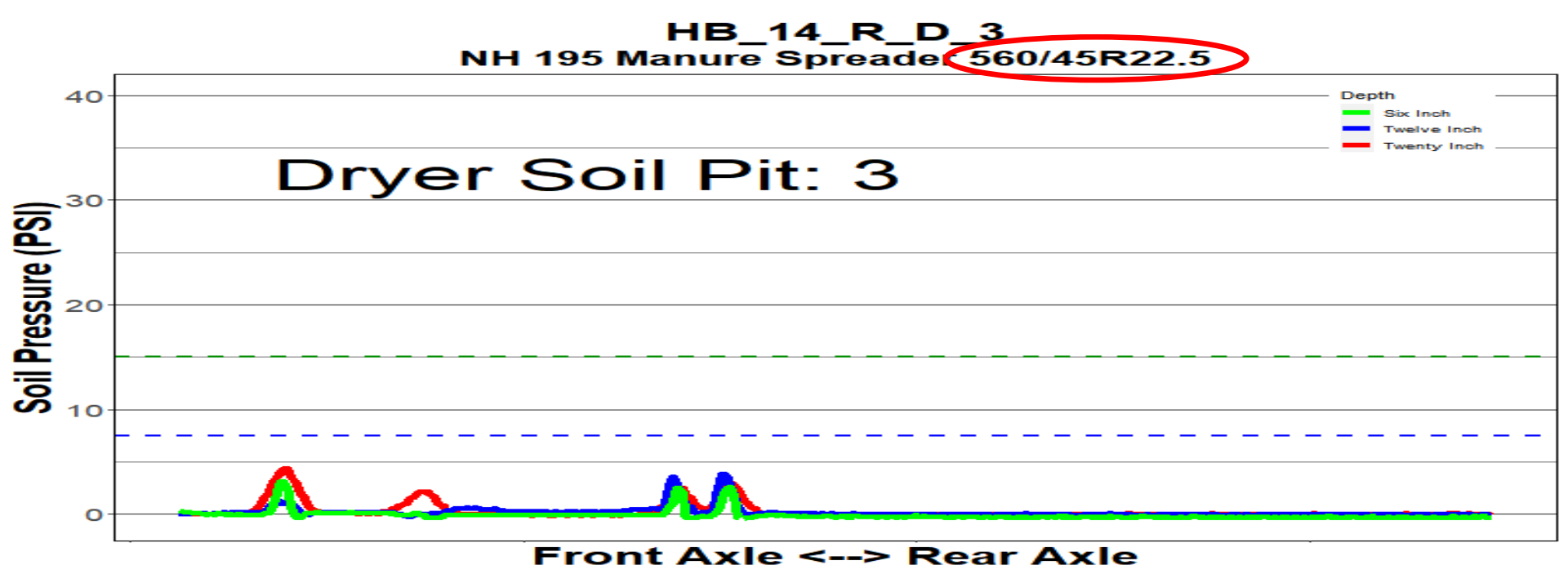
INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	American Farmer	American Farmer				
Tire Model:						
Tire Type:						
Tire Size:	16.5 L-16.15L	16.5 L-16.15L				
TireWt (lbs):	3840	4080				
Road PSI:	28	28				
Field PSI:						
OnArrival PSI:	34	29.5				

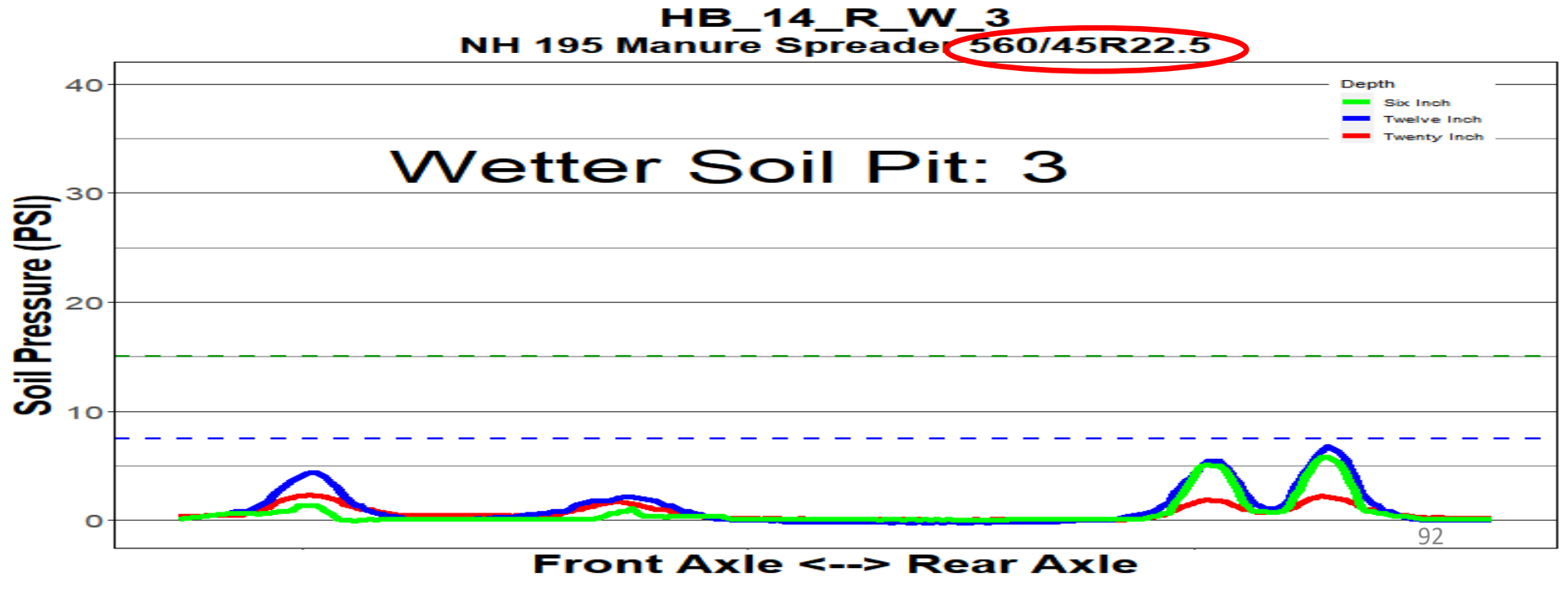

HB_14_L_D_2
NH 195 Manure Spreader 16.5L-16.1L Bias Tires
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

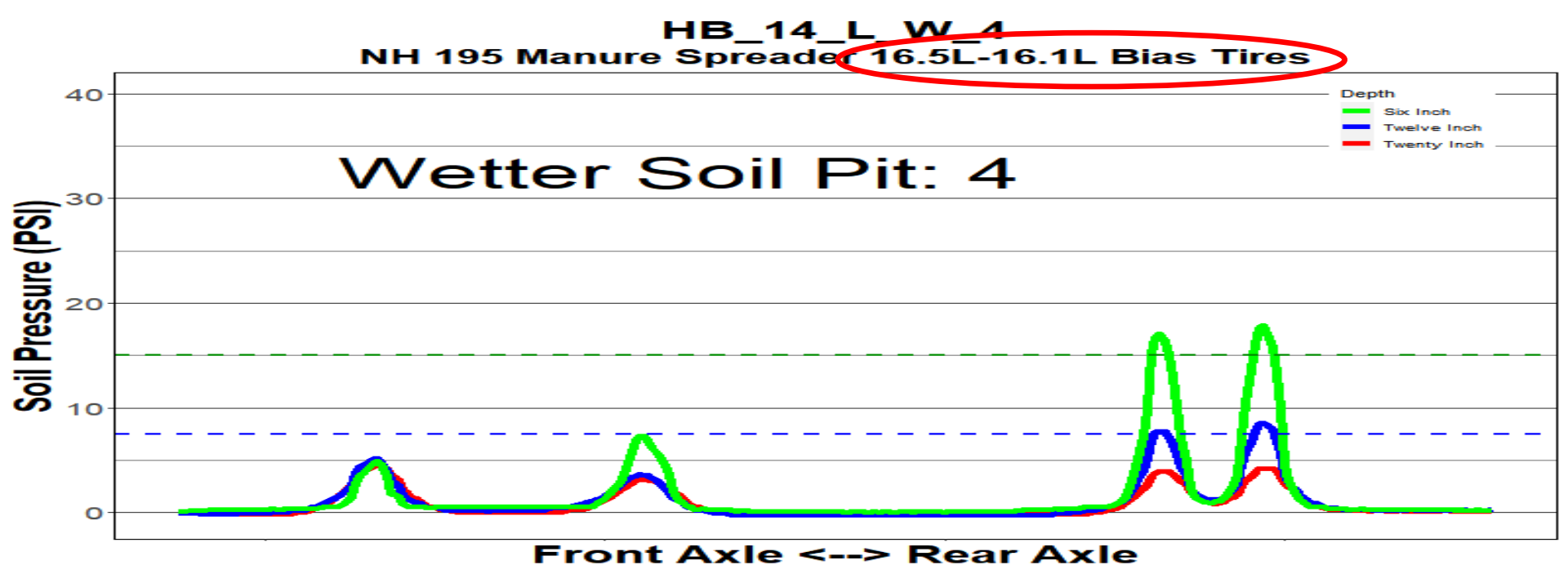

HB_14_R_D_2
NH 195 Manure Spreader 560/45R22.5
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

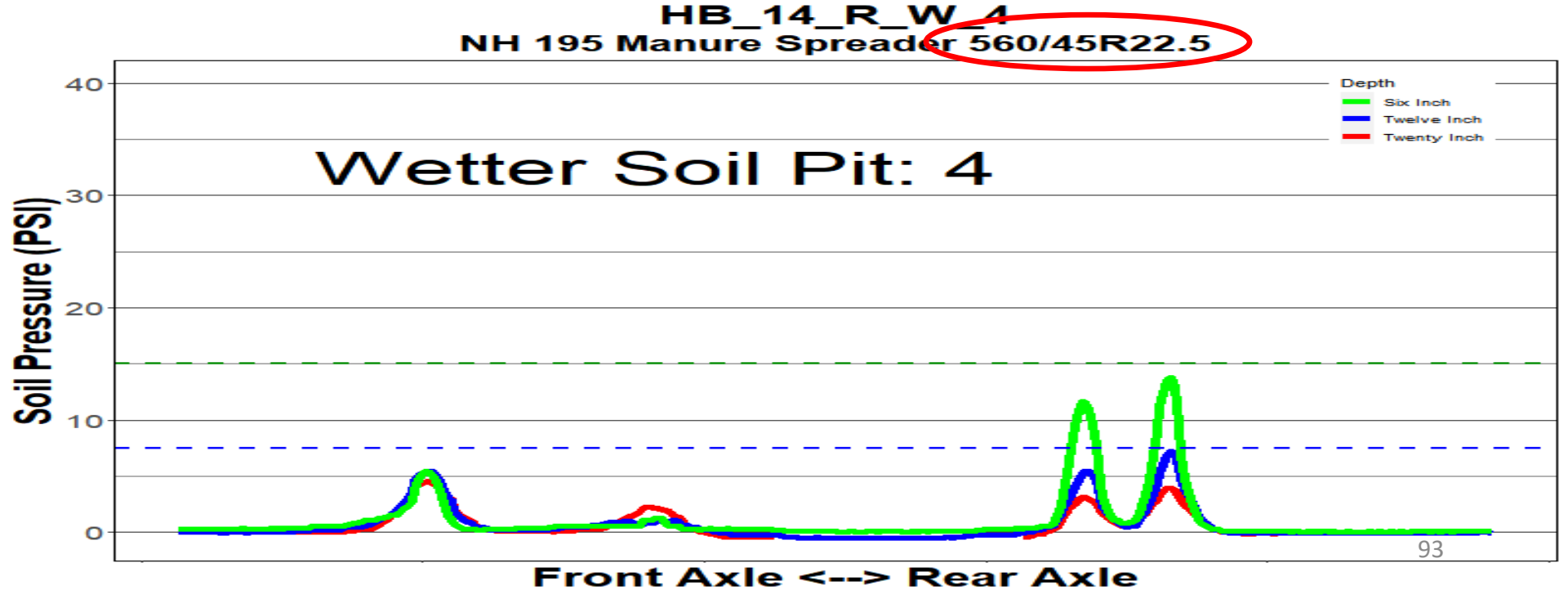

HB_14_L_W_2
NH 195 Manure Spreader 16.5L-16.1L Bias Tires
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_14_R_again_W_2
NH 195 Manure Spreader 560/45R22.5
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_14_R_D_3
NH 195 Manure Spreader 560/45R22.5
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_14_R_W_3
NH 195 Manure Spreader 560/45R22.5
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_14_L_W_4
NH 195 Manure Spreader 16.5L-16.1L Bias Tires
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_14_R_W_4
NH 195 Manure Spreader 560/45R22.5
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB14

- The first set of graphs for Dry Pit 2 show the site problem of the compacted surface layer that transferred pressure directly down to 20” since it was a solid mass of soil, this was overcome when the soil was wetted in the wet pits.
- The wider tires increase the contact patch on the soil surface which decreases the lbs/sq/inch, but the full axle weight doesn’t change between the two tire types.
- The narrower bias tires have non uniform contact patch left to right, meaning it is hard to confidently measure the maximum stress on the soil.
- Considering that much of dry manure spreading happens in spring and fall, moving to radial ag tires and better tires in general should be considered.
- When looking at the data graphs above pay attention to dry/wet and 16.5 bias vs 455 radials and the corresponding difference in recommended tire pressure 28 vs 17 a 39% difference in psi plus a bigger contact patch with the 455 tires.
- This unit really shows the state of soil wetness on threat from compaction when you compare dry and wet pits under heavy loads.


New Holland
195


New Holland


New Holland

2022 Hamilton-Brant SCIA Compaction Event

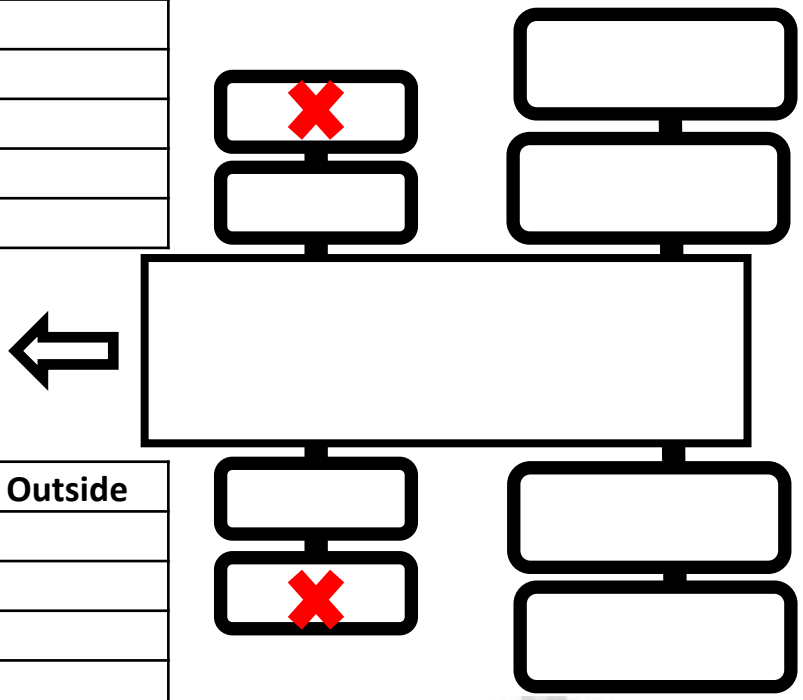
Exhibit: HB15 + HB16 John Deere JD 7270R RC Tractor w Dual 650s + Kuhn Protwin Slurry Slinger w Tandem 800s &CTIS


HB15
HB16

Exh#:	HB-15	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Stonewater Ag	Phone#:
EquipType:	RC Tractor	Make:	JD	Model: 7270R

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Machbib	
Tire Type:	Radial	
Tire Size:	600/70R30	
TireWt (lbs):	4600	
Road PSI:	10	
Field PSI:	7	
OnArrival PSI		

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Machbib	Machbib
Tire Type:	Raidal	Raidal
Tire Size:	650/85/R38	650/85/R38
TireWt (lbs):	6460	5700
Road PSI:	10	10
Field PSI:	7	7
OnArrival PSI		



INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Machbib	
Tire Type:	Radial	
Tire Size:	600/70R30	
TireWt (lbs):	4240	
Road PSI:		
Field PSI:		
OnArrival PSI		

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Machbib	Machbib
Tire Type:	Raidal	Raidal
Tire Size:	650/85/R38	650/85/R38
TireWt (lbs):	6580	6500
Road PSI:	10	10
Field PSI:	7	7
OnArrival PSI		

Row Crop Tractor - Wheeled

CTIS: Yes / No?


KUHN
KNIGHT
SLINGER
SLC 150
KUHN
KNIGHT

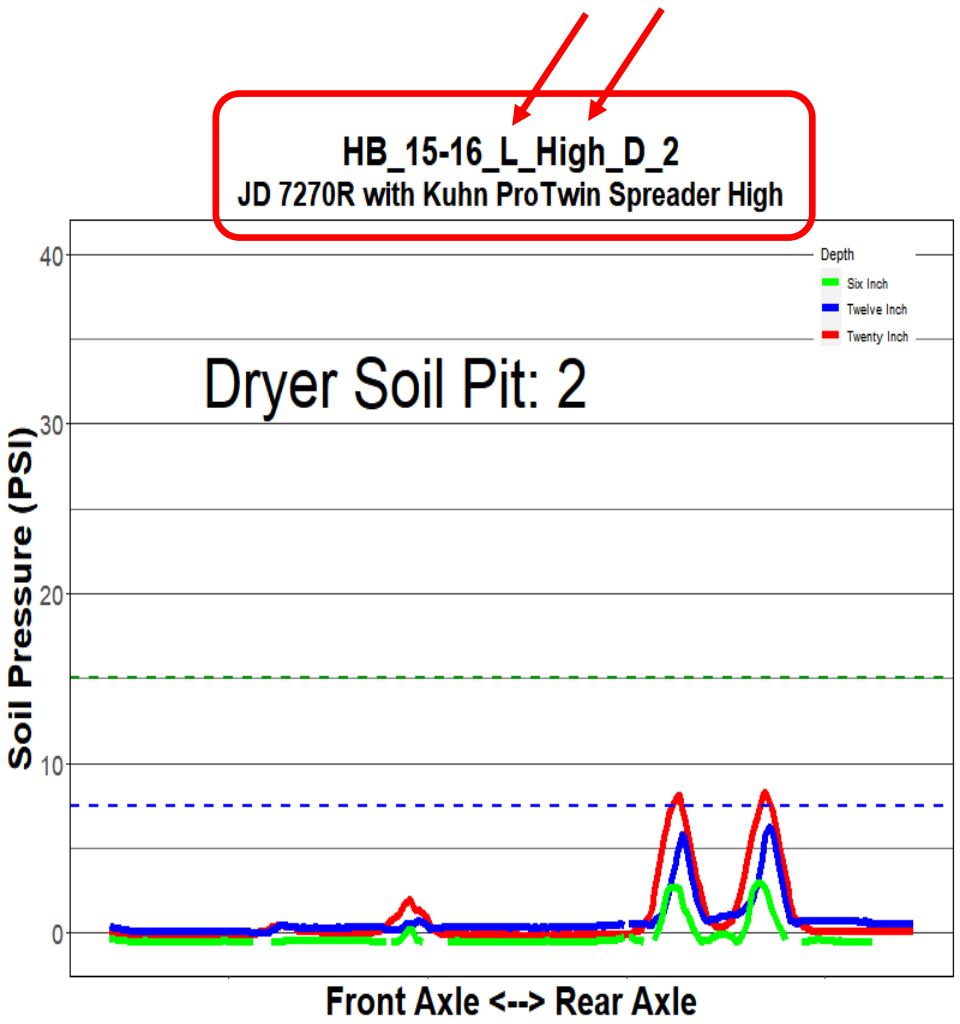
Exh#:	HB-16	ExhNote:	HB-15		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Stonewater Ag	Phone#:	
EquipType:	Manure Spreader		Make: Kuhn	Model:	Protwin Slurry Slinger

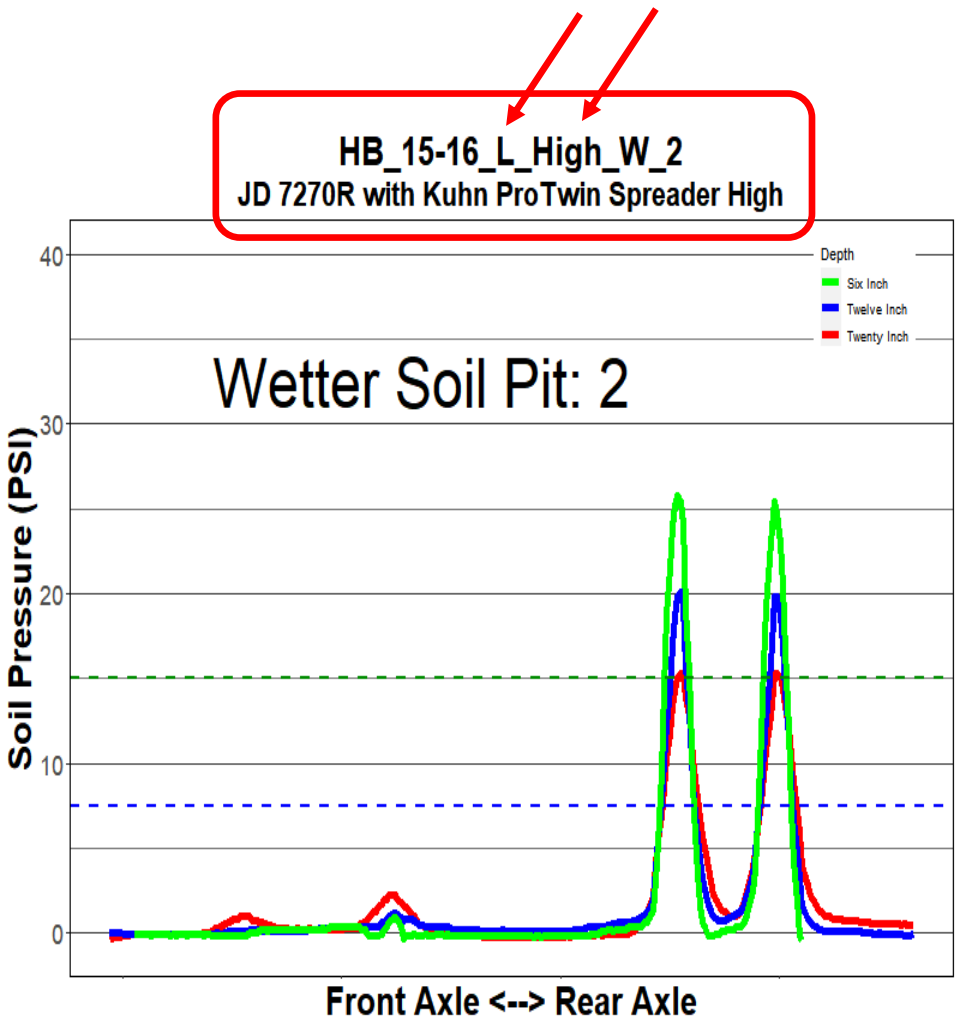
INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Michelin	Michelin				
	Cargobib	Cargobib				
Tire Model:	Radial	Radial				
Tire Type:	800/60R32	800/60R32				
Tire Size:	16,600	15,700				
TireWt (lbs):	31	31				
Road PSI:	17	17				
Field PSI:	CTIS	CTIS				

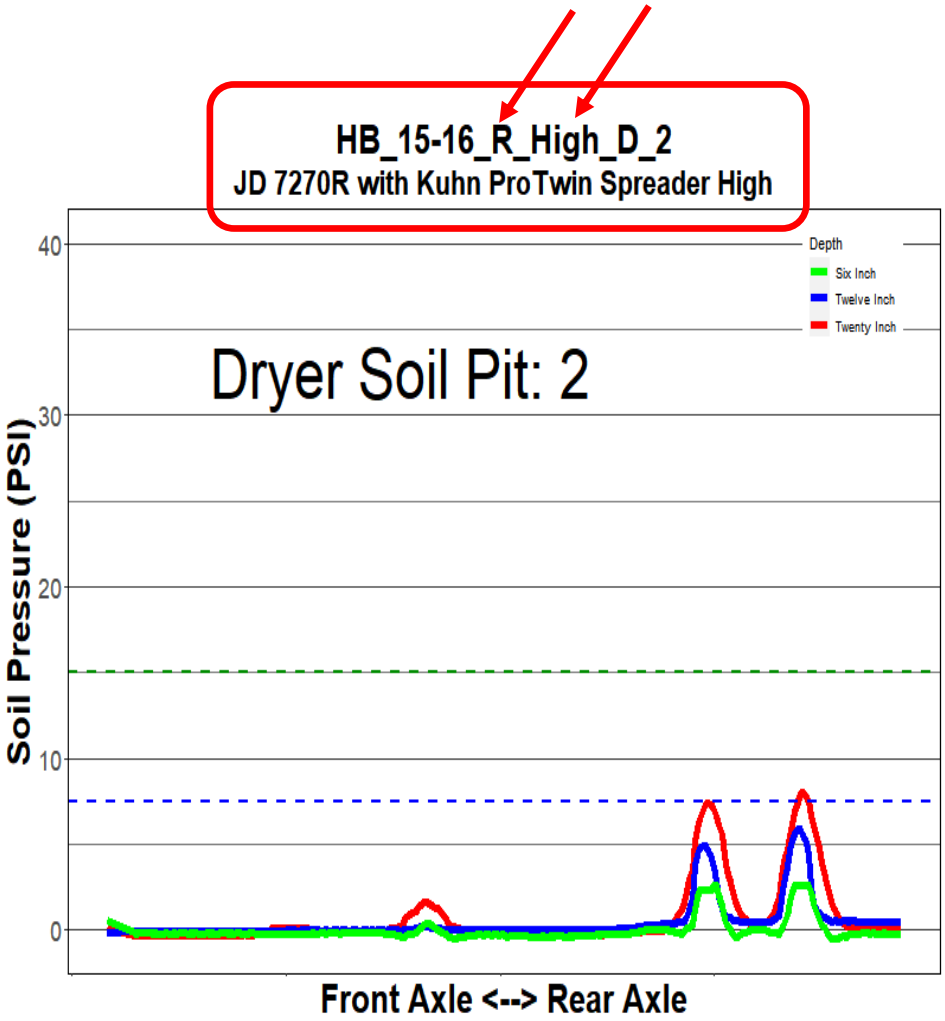
Empty or Loaded?

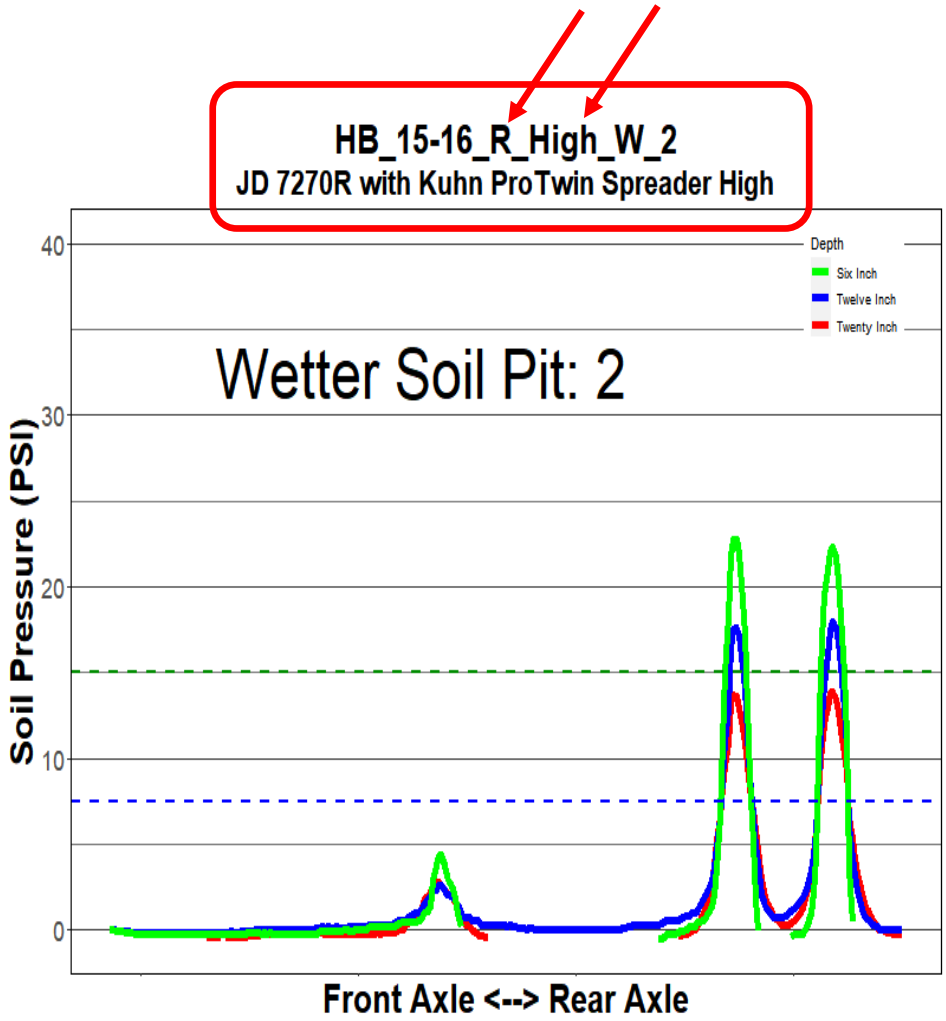
CTIS:
Yes / No

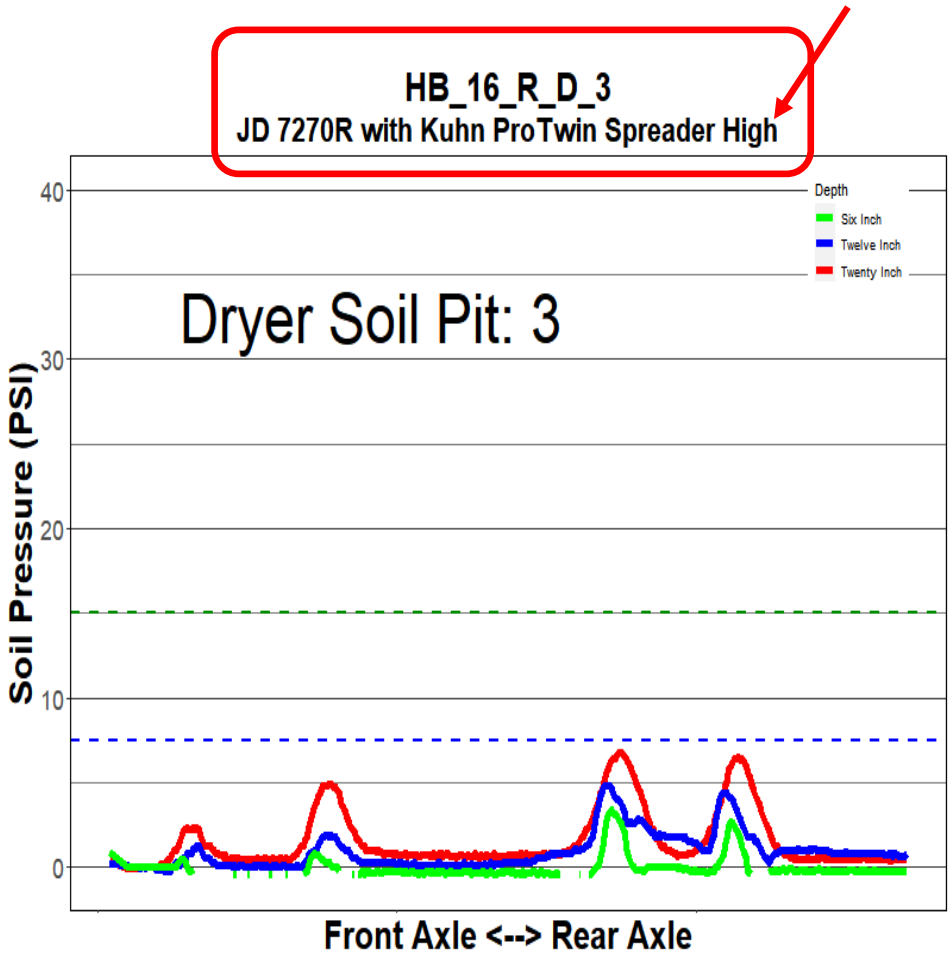
INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Michelin	Michelin				
	Cargobib	Cargobib				
Tire Model:	Radial	Radial				
Tire Type:	800/60R32	800/60R32				
Tire Size:	18,460	17,640				
TireWt (lbs):	31	31				
Road PSI:	17	17				
Field PSI:	CTIS	CTIS				

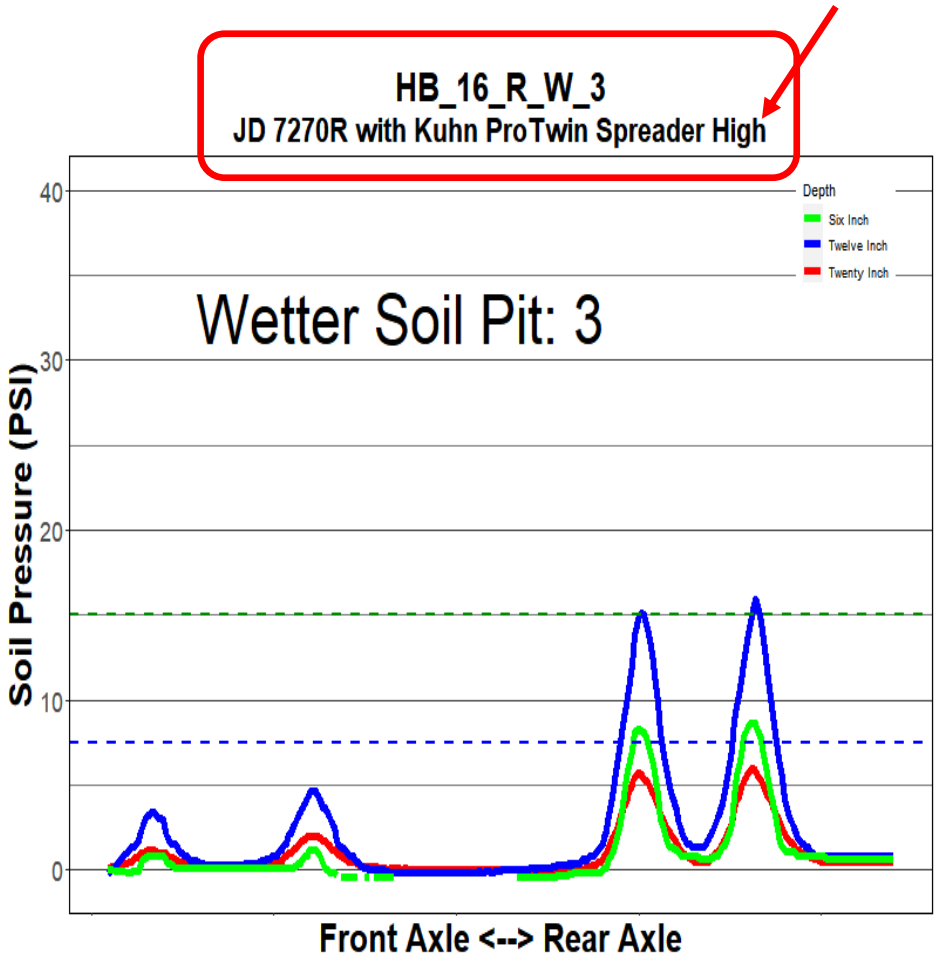

HB_15-16_L_High_D_2
JD 7270R with Kuhn ProTwin Spreader High
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

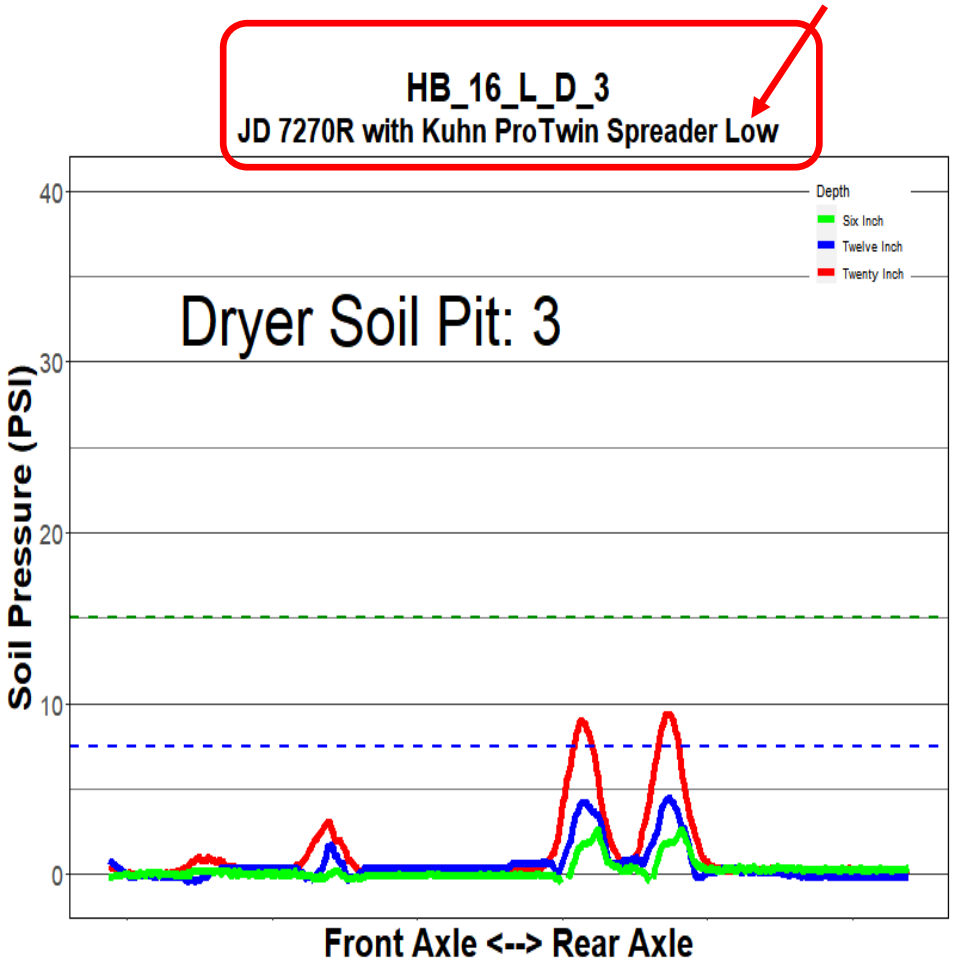

HB_15-16_L_High_W_2
JD 7270R with Kuhn ProTwin Spreader High
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

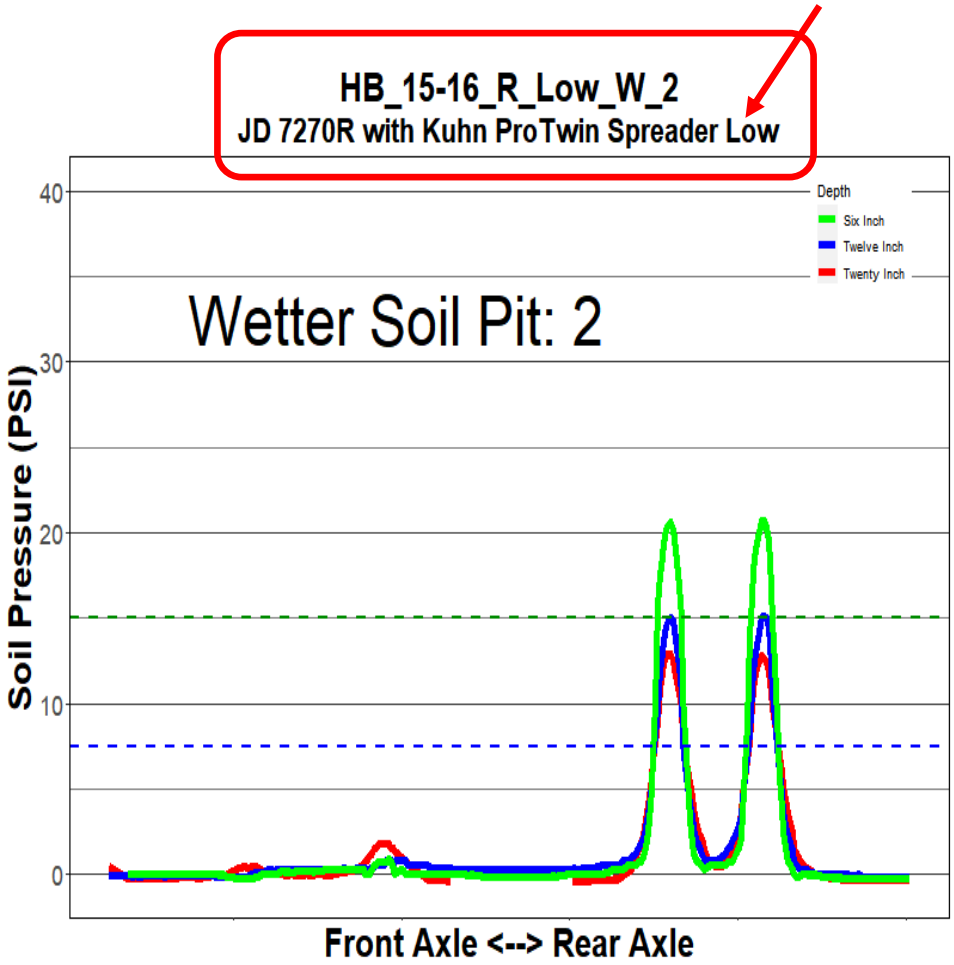

HB_15-16_R_High_D_2
JD 7270R with Kuhn ProTwin Spreader High
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

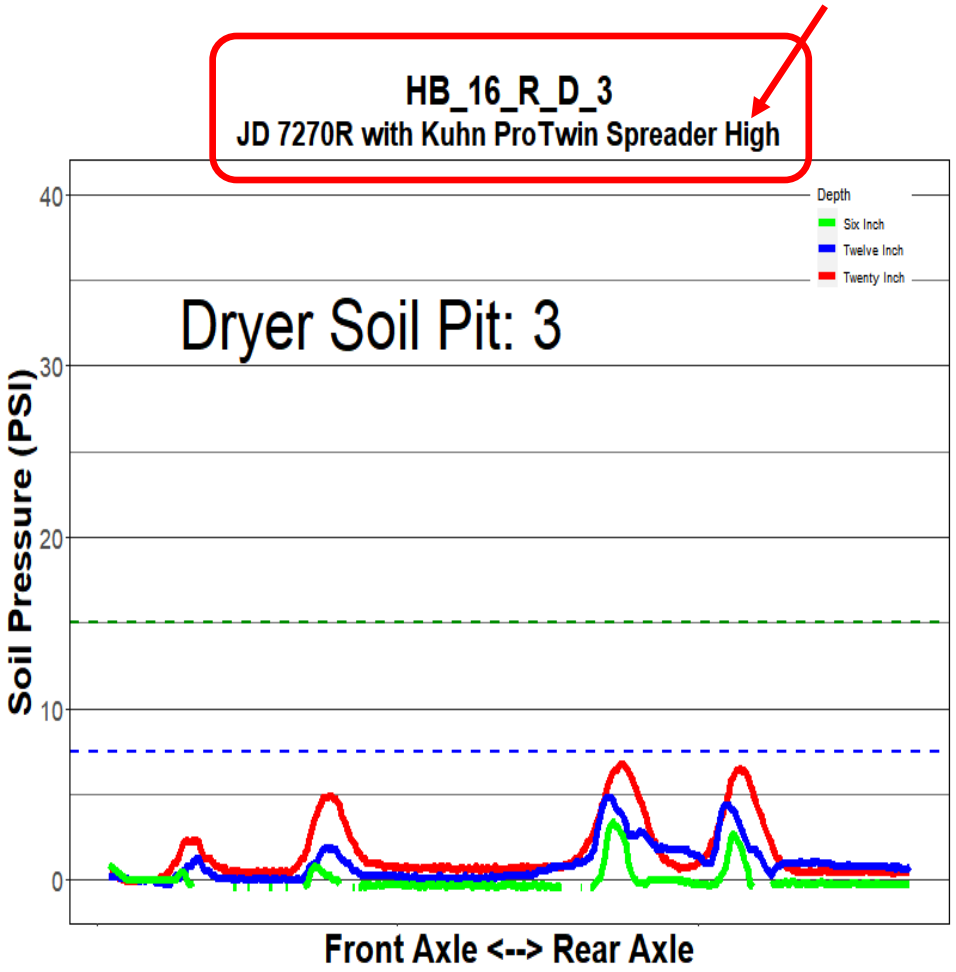

HB_15-16_R_High_W_2
JD 7270R with Kuhn ProTwin Spreader High
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

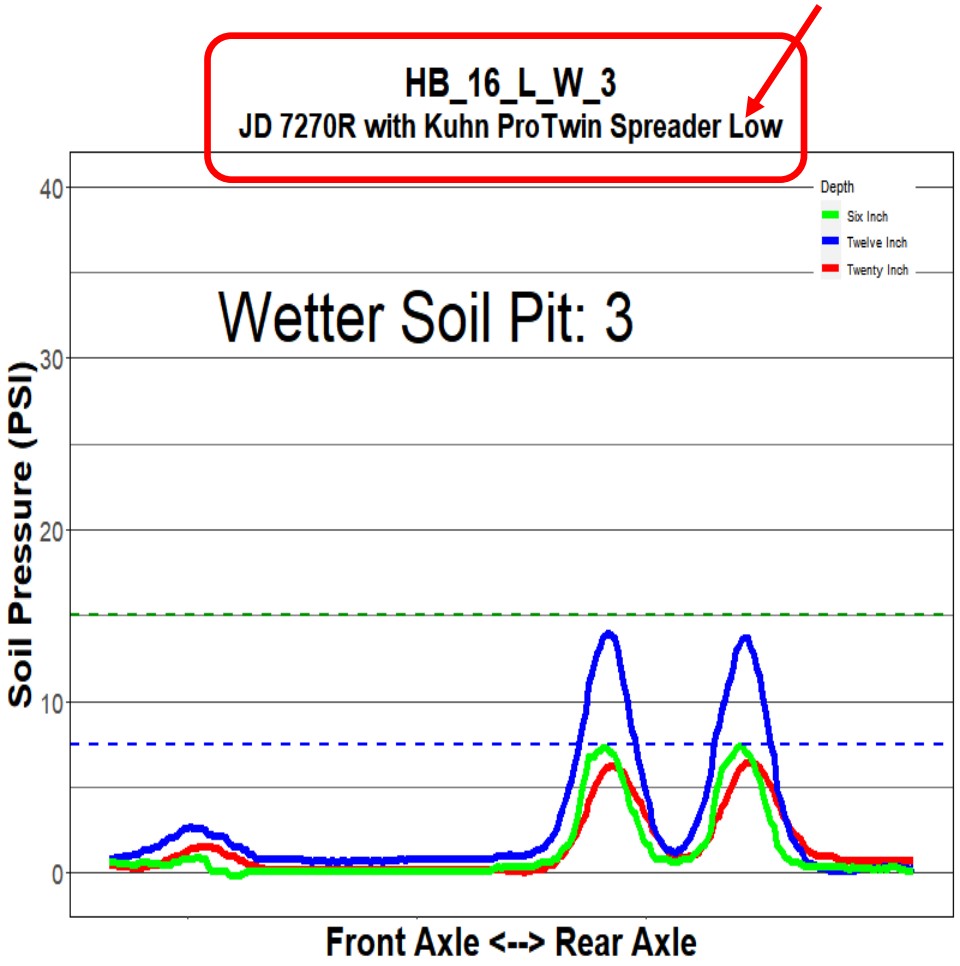

HB_16_R_D_3
JD 7270R with Kuhn ProTwin Spreader High
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

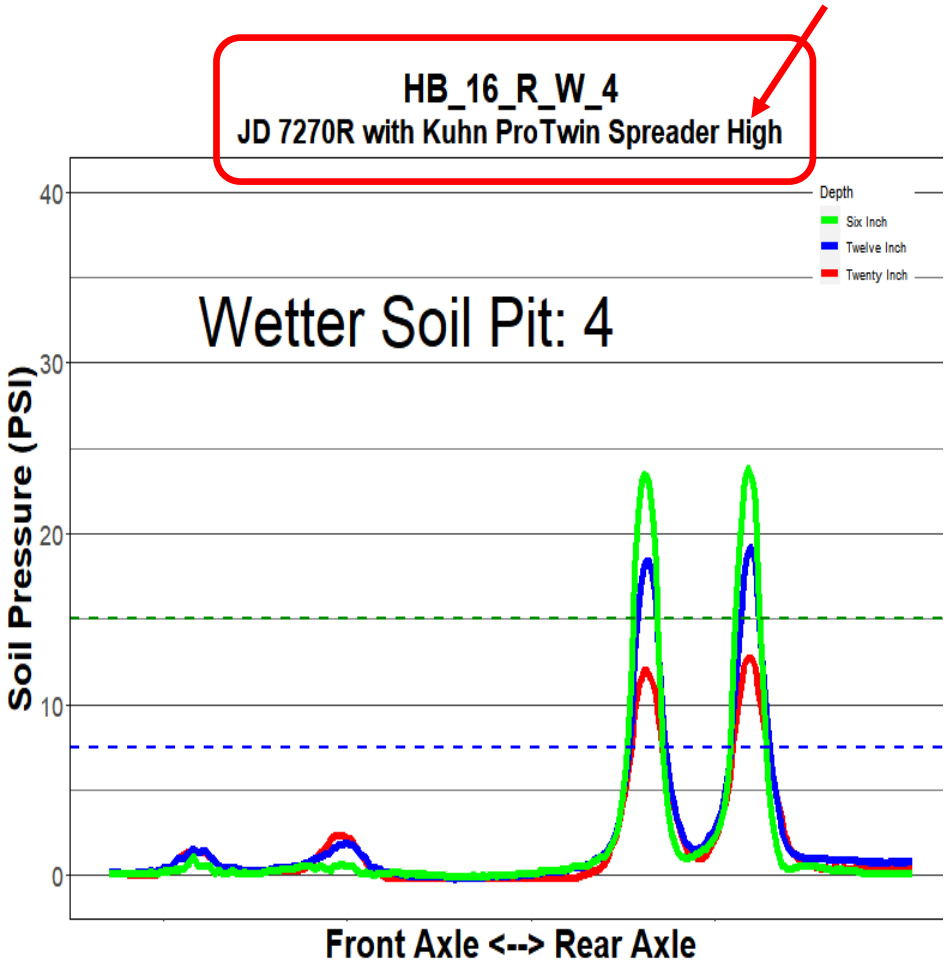

HB_16_R_W_3
JD 7270R with Kuhn ProTwin Spreader High
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

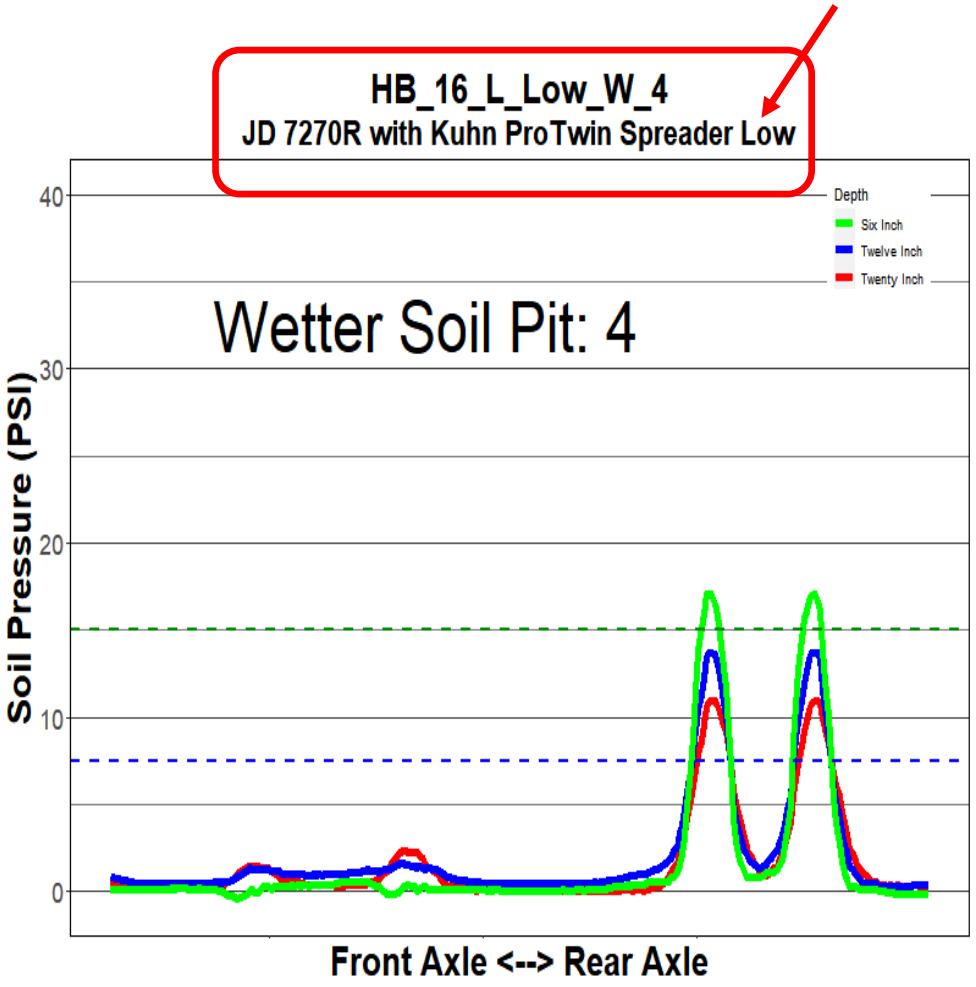

HB_16_L_D_3
JD 7270R with Kuhn ProTwin Spreader Low
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_15-16_R_Low_W_2
JD 7270R with Kuhn ProTwin Spreader Low
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_16_R_D_3
JD 7270R with Kuhn ProTwin Spreader High
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_16_L_W_3
JD 7270R with Kuhn ProTwin Spreader Low
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_16_R_W_4
JD 7270R with Kuhn ProTwin Spreader High
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_16_L_Low_W_4
JD 7270R with Kuhn ProTwin Spreader Low
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB15 + HB16

- Plots show a reduction in stress with the lower tire pressures.
- Response for the _3 pit location is unexpected.
- The difference between left and right for the _2 location is due to the heavier tires on the left side, due to the way the spreader was loaded. This is something that has to be considered when setting tire pressures for equipment that can have uneven load distribution, err towards the higher weight to set pressure to avoid tire failures during higher speed road travel.
- Items like this spreader greatly benefit from adding a CTIS system to enable significant differential in tire pressure between road and field, otherwise, you would be required to use the much higher road PSI setting in the field.


SLINGER
SLC 150
KUHN


KUHN


KUHN
KNIGHT
20


BLINGER
SLC 150
KUHN


MICHELIN


KUHN
BLINGER
SLC 150

2022 Hamilton-Brant SCIA Compaction Event

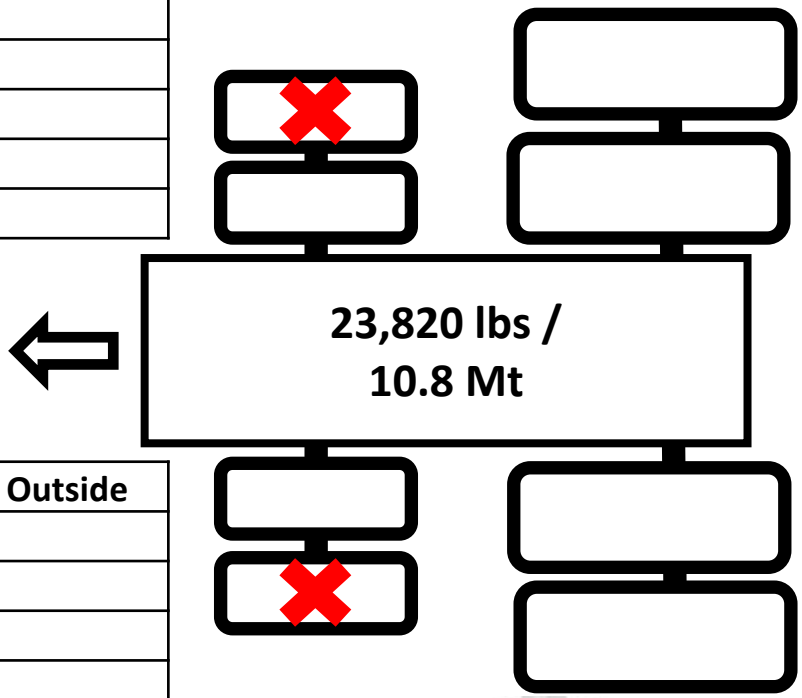
Exhibit: HB17 + HB18
John Deere JD 4560 RC Tractor w Dual 520s + JD 1590 Seed Drill w VF480s vs Bias 31s


HB17
HB18
JOHN DEERE
4560

Exh#:	HB17	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	McIntyre	Phone#:
EquipType:	Row Crop Tractor	Make:	John Deere	Model: 4560

INFO	Inside	Outside
Tire/Trk Make:	Titan	
Tire Model:	Hi-Traction	
Tire Type:	Radial	
Tire Size:	16.9 R30	
TireWt (lbs):	2320	
Road PSI:	9	
Field PSI:	7	
OnArrival PSI	9.4	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	Michelin
Tire Model:	Traction 23	Agribib
Tire Type:	Radial	Radial
Tire Size:	520/85 R42	520/85 R42
TireWt (lbs):	6580	3100
Road PSI:	17	17
Field PSI:	17	17
OnArrival PSI	18	18.7



INFO	Inside	Outside
Tire/Trk Make:	Titan	
Tire Model:	Hi-Traction	
Tire Type:	Radial	
Tire Size:	16.9 R30	
TireWt (lbs):	2360	
Road PSI:	9	
Field PSI:	7	
OnArrival PSI	11.8	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	Michelin
Tire Model:	Traction 23	Agribib
Tire Type:	Radial	Radial
Tire Size:	520/85 R42	520/85 R42
TireWt (lbs):	5700	3760
Road PSI:	17	17
Field PSI:	17	17
OnArrival PSI	17.8	18.1

Row Crop Tractor - Wheeled

CTIS: Yes / No?


JOHN DEERE
1590
VF
VF480/45R17
Bias
31x13.50-15

Exh#:	HB18	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	McIntyre	Phone#:
EquipType:	Seed Drill	Make:	John Deere	Model: 1590

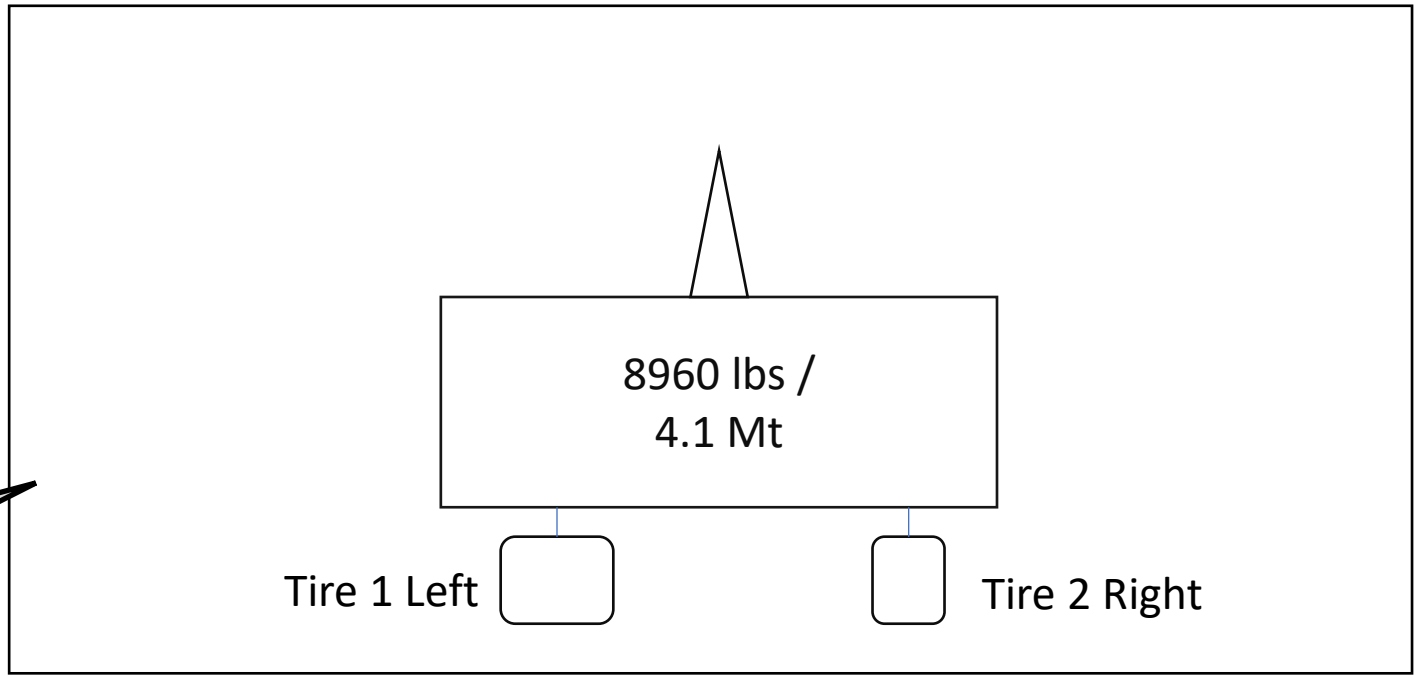
INFO	Tire 1	Tire 2	Tire 3	Tire 4	Tire 5	Tire 6	Tire 7	Tire 8
Tire/Trk Make:	BKT	Firestone						
Tire Model:		Turf + Field						
Tire Type:	VF	Bias						
Tire Size:	480/45 R17	31/13.50-15						
TireWt (lbs):	4860	4100						
Road PSI:	19	45						
Field PSI:	19	45						
OnArrival PSI	14	28.2						

E = empty and L = loaded

R = road and F = field

Misc. Equipment

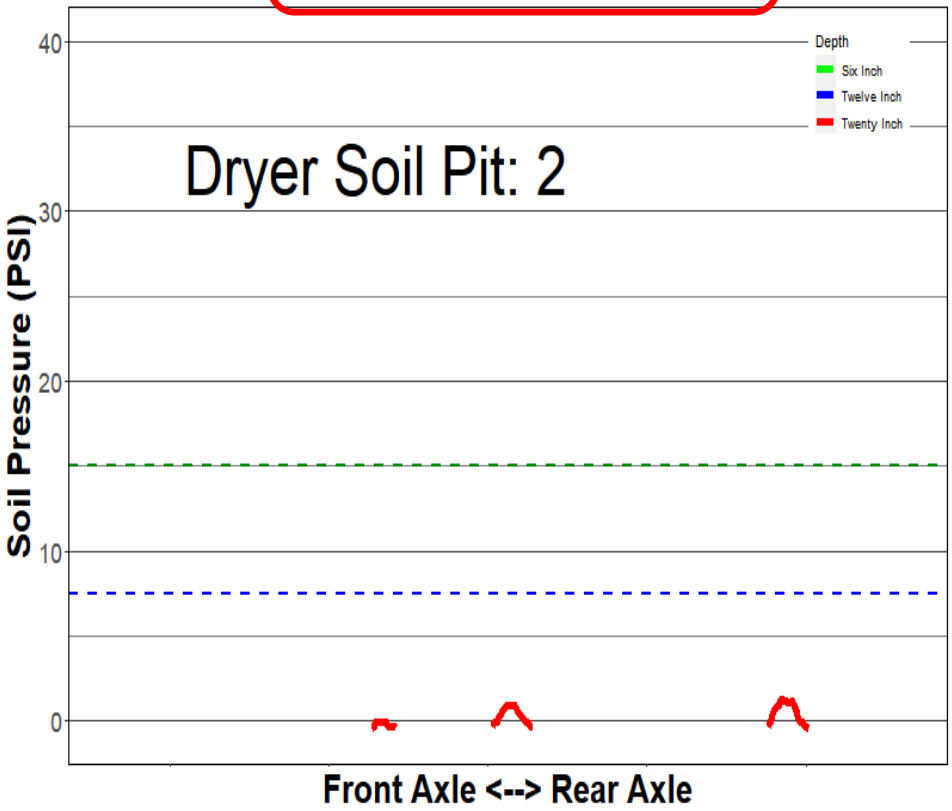
Draw Tire Layout and Label Each Tire



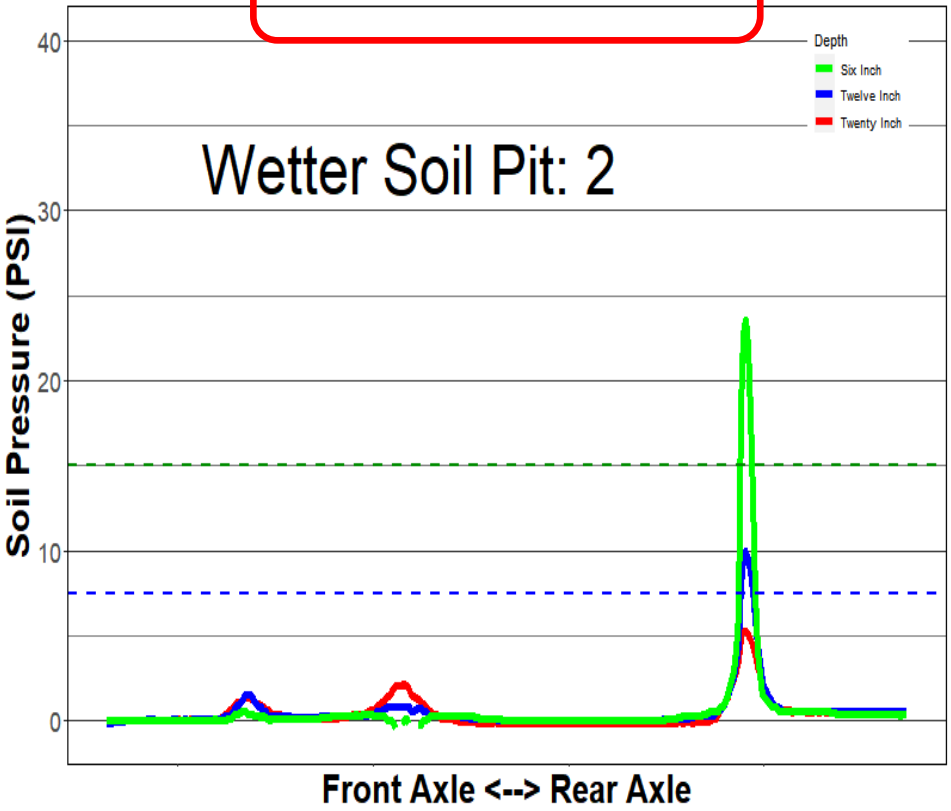
Box Drill Planter

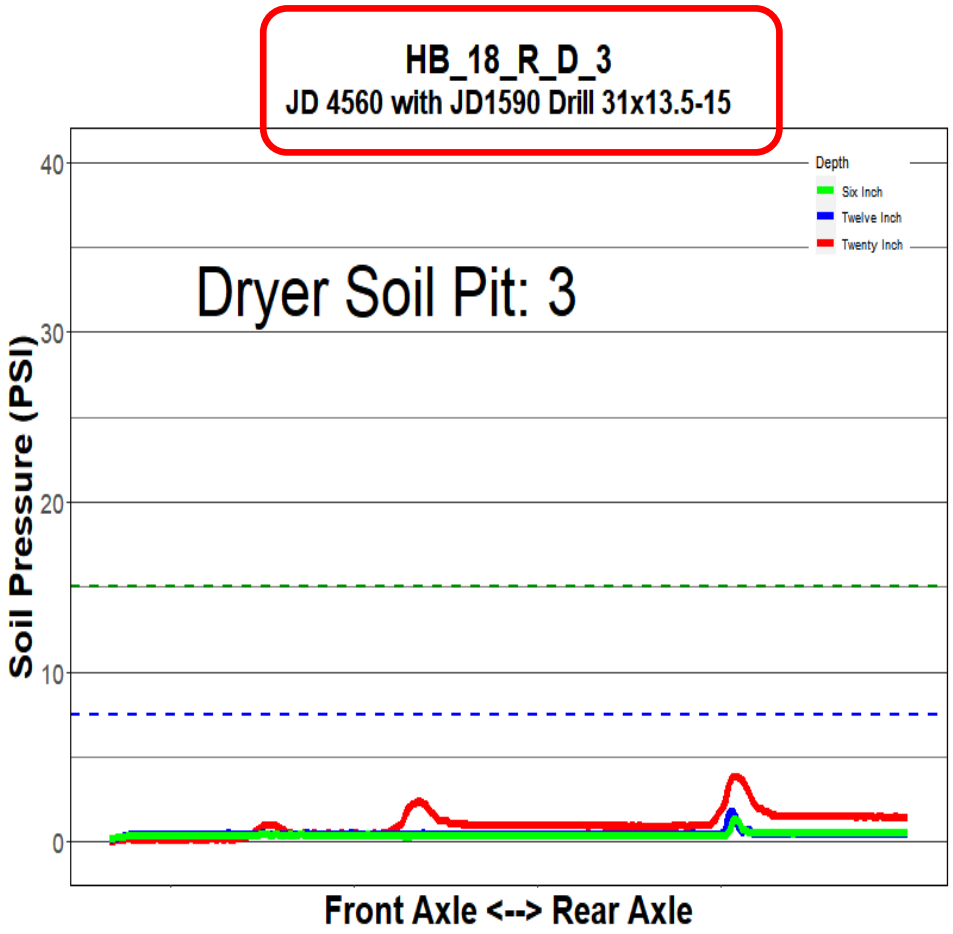
CTIS: Yes / No?

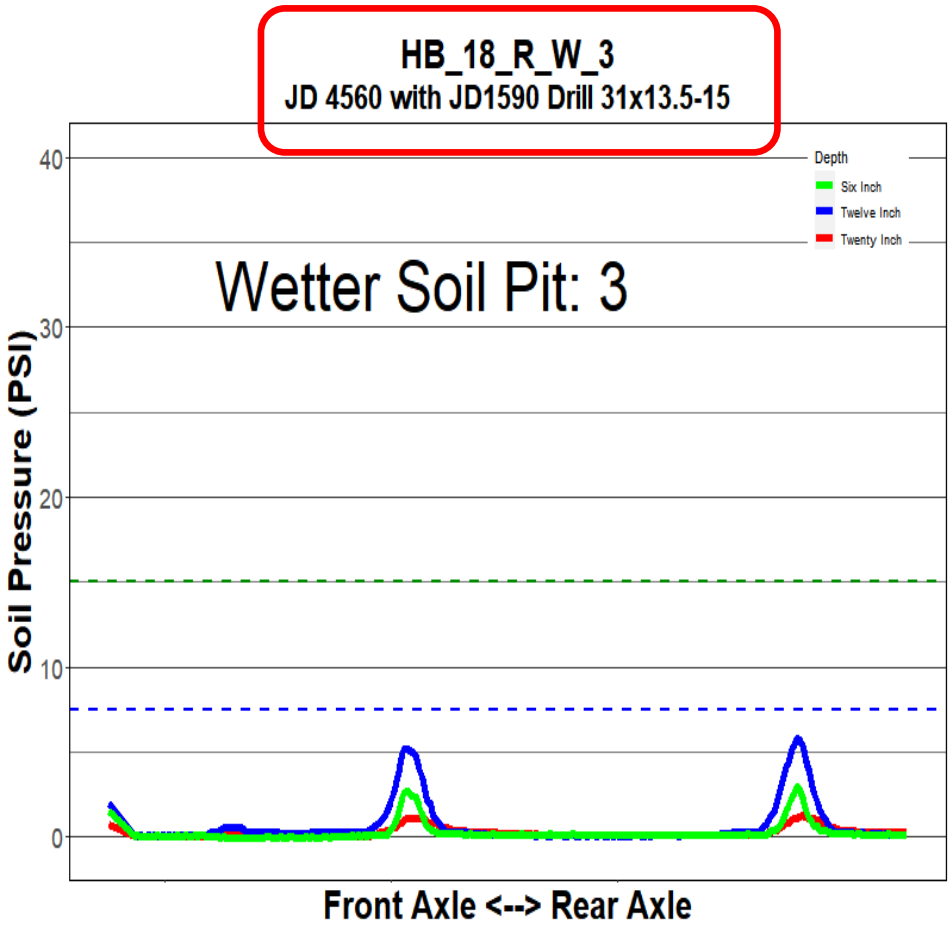
HB_17-18_R_D_2
JD 4560 with JD1590 Drill 31x13.5-15

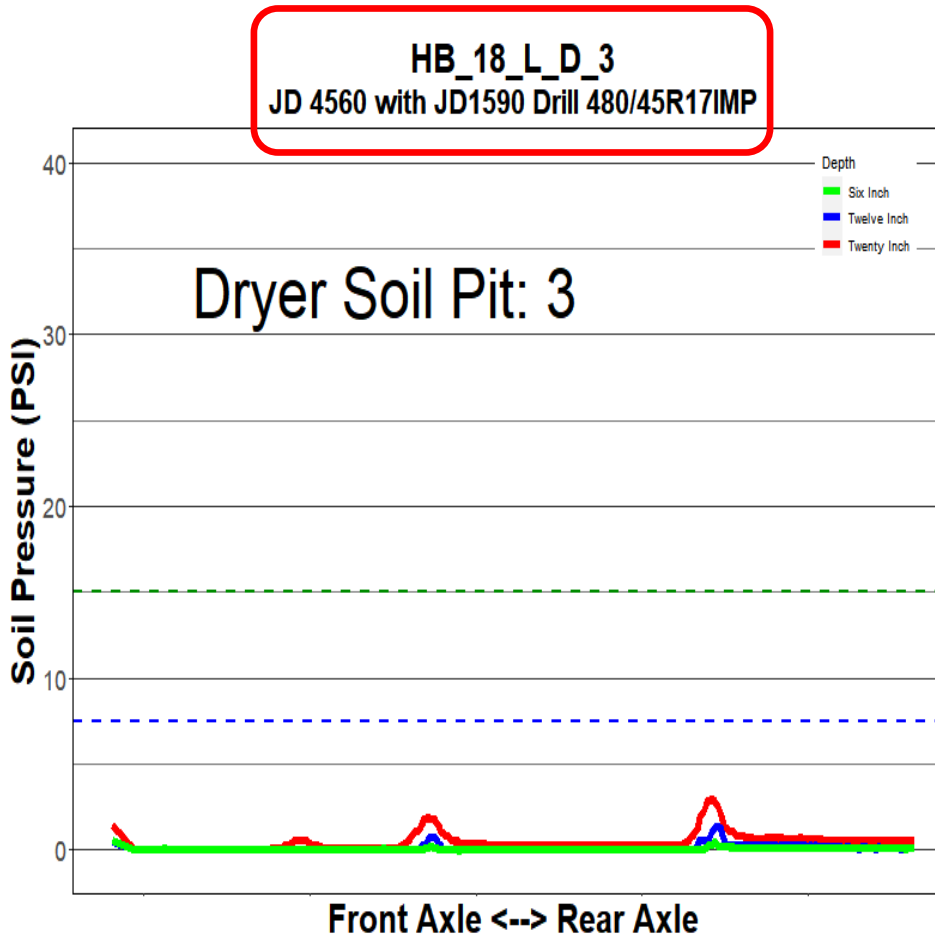


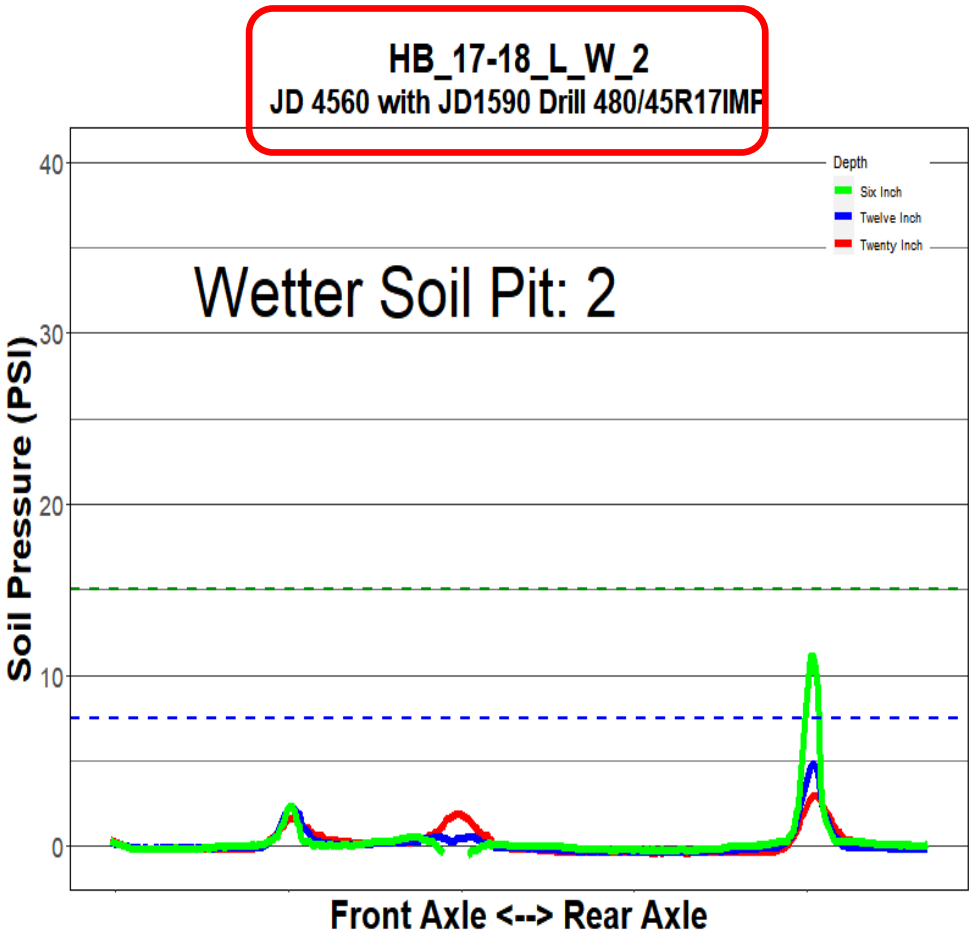
HB_17-18_R_W_2
JD 4560 with JD1590 Drill 31x13.5-15

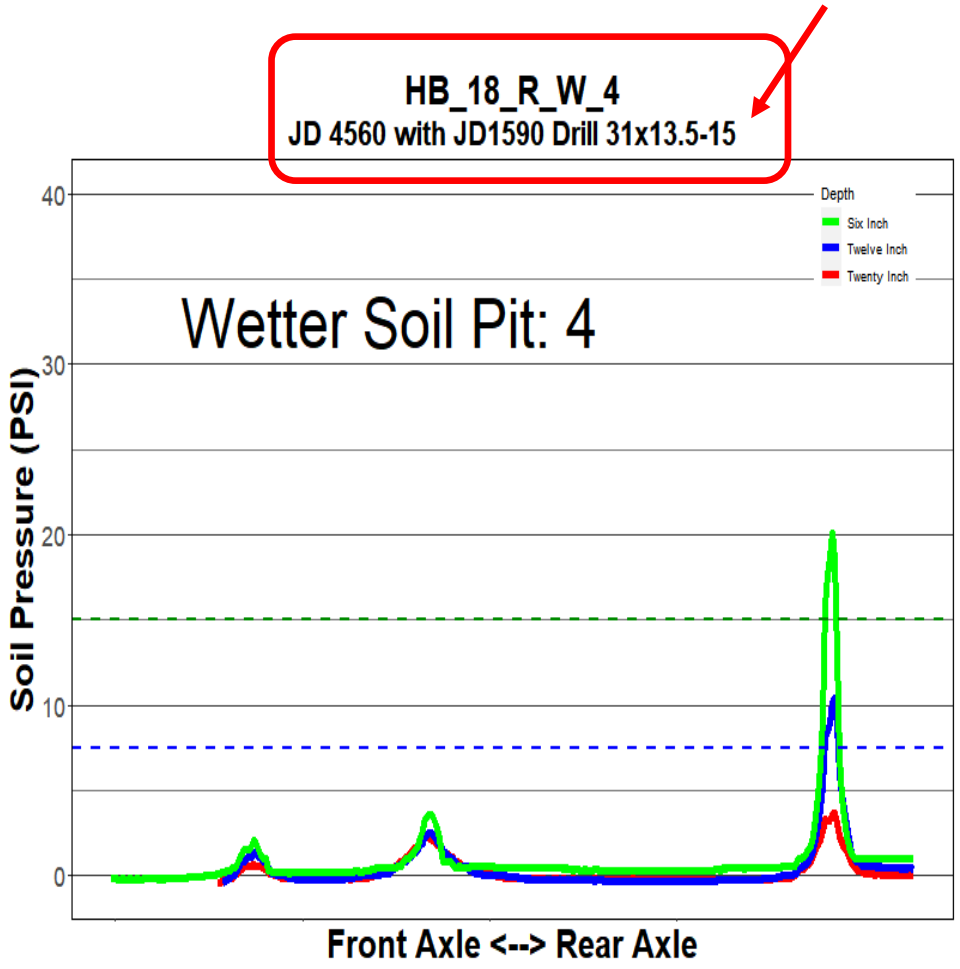


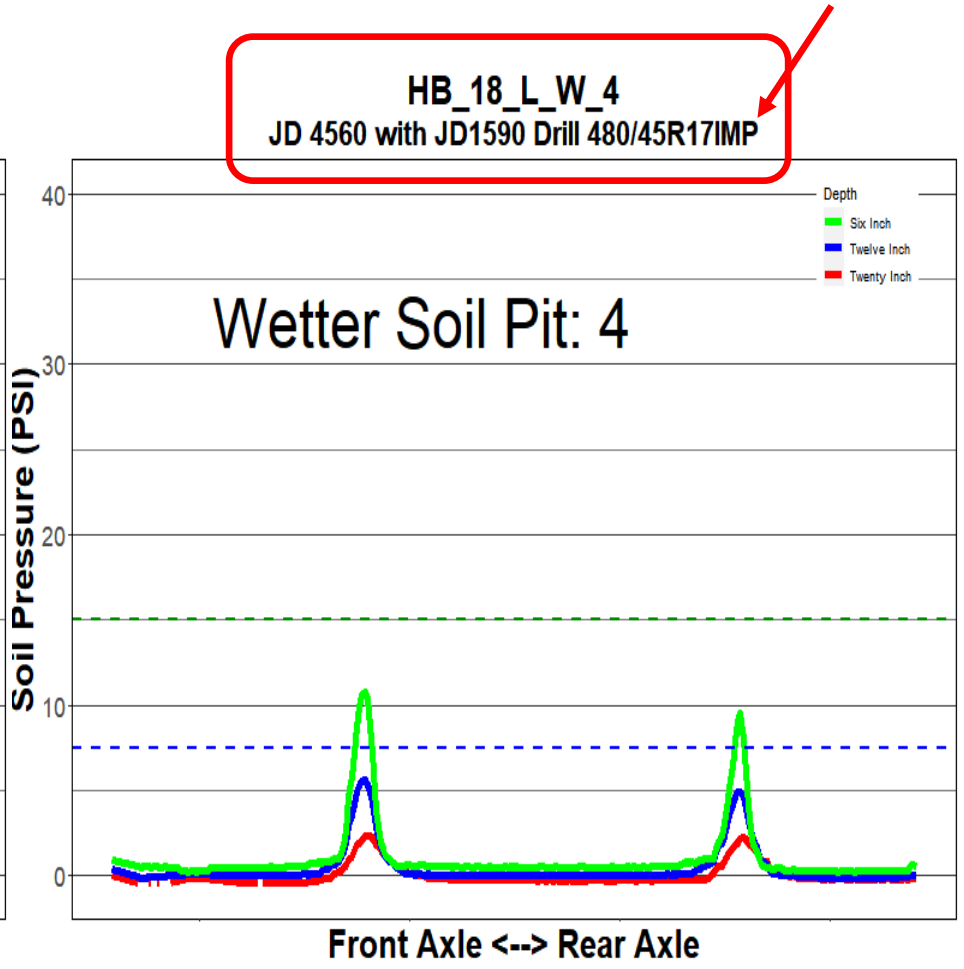

HB_18_R_D_3
JD 4560 with JD1590 Drill 31x13.5-15
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_18_R_W_3
JD 4560 with JD1590 Drill 31x13.5-15
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_18_L_D_3
JD 4560 with JD1590 Drill 480/45R17IMP
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_17-18_L_W_2
JD 4560 with JD1590 Drill 480/45R17IMP
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_18_R_W_4
JD 4560 with JD1590 Drill 31x13.5-15
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_18_L_W_4
JD 4560 with JD1590 Drill 480/45R17IMP
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB17 + HB18

- The Radial implement tire is much better suited to carry this load as shown comparing Wet Pits 2/4 for each tire type.
- The Dry Pit graphs show an interesting finding at this location where there was a 6”-8” hard pan that when sensed dry was projecting the soil stress directly to the deeper sensor. This was not seen with the wetted soil which would have reduced the effect of that hard pan.
- Investing in bigger, better tires on implements like drills which carry considerable load make sense to reduce the risk of soil compaction


JOHN DEERE
1590


JOHN DEERE


1590


HB17
HB16

2022 Hamilton-Brant SCIA Compaction Event

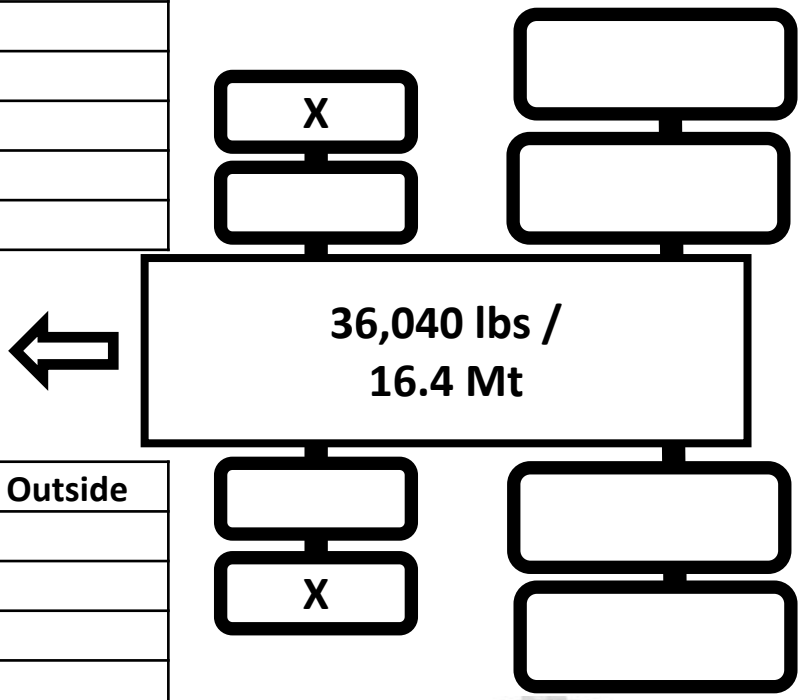
Exhibit: HB20 + HB21 Massy Ferguson MF 8660 w Dual 710s + Brent 1080 Grain Cart w VF900 vs Bias 35.5


BRENT
MASSEY FERGUSON

Exh#:	HB20	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Baker	Phone#:
EquipType:	Row Crop Tractor	Make:	Massey Ferguson	Model: 8660

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MachXBib	
Tire Type:	Radial	
Tire Size:	600/70 R28	
TireWt (lbs):	6940	
Road PSI:	17	
Field PSI:	14	
OnArrival PSI	23.4	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Goodyear
Tire Model:	MachXBib	Optitrac
Tire Type:	Radial	Radial
Tire Size:	710/70 R42	710/70 R42
TireWt (lbs):	6380	4920
Road PSI:	10	10
Field PSI:	10	10
OnArrival PSI	16.8	14.3

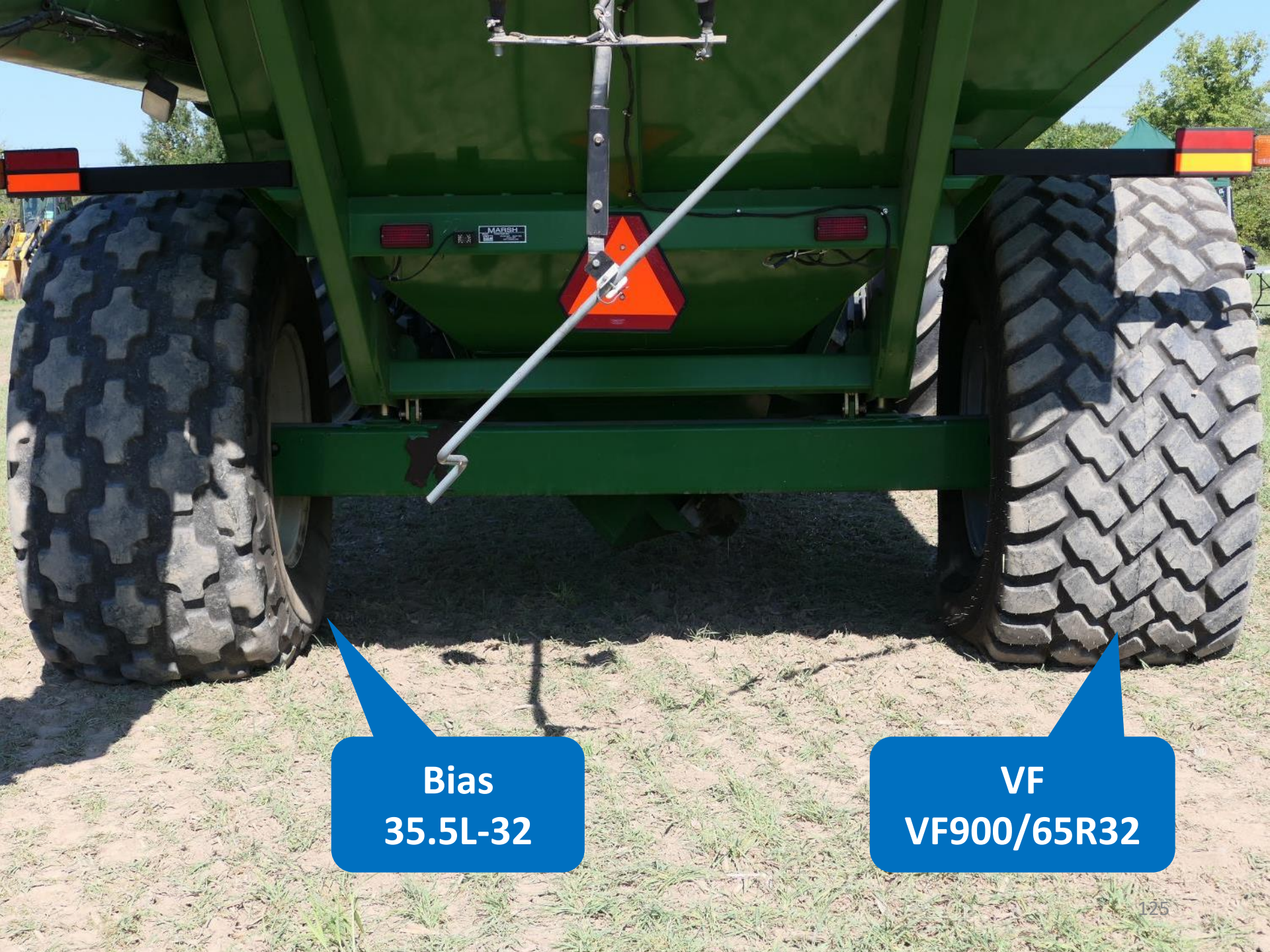


INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	MachXBib	
Tire Type:	Radial	
Tire Size:	600/70 R28	
TireWt (lbs):	7000	
Road PSI:	17	
Field PSI:	14	
OnArrival PSI	28.6	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Goodyear
Tire Model:	MachXBib	Optitrac
Tire Type:	Radial	Radial
Tire Size:	710/70 R42	710/70 R42
TireWt (lbs):	6200	4600
Road PSI:	10	10
Field PSI:	10	10
OnArrival PSI	15.3	16.3

Row Crop Tractor - Wheeled

CTIS: Yes / No?

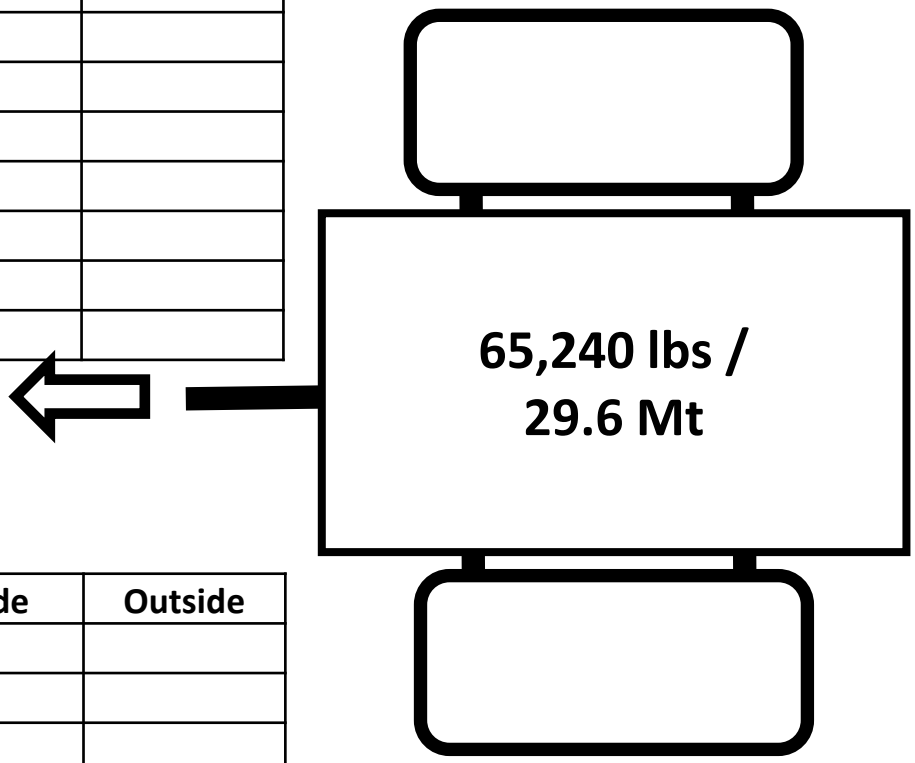

MARSH
Bias
35.5L-32
VF
VF900/65R32


BRENT
1080
KUBOTA

Exh#:	HB21	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Baker	Phone#:
EquipType:	Grain Cart	Make:	Brent	Model: 1080

INFO	Inside	Outside
Tire/Trk Make:		
Tire Model:		
Tire Type:		
Tire Size:		
TireWt (lbs):		
Road PSI:		
Field PSI:		
OnArrival PSI		

INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Ridemax	
Tire Type:	VF	
Tire Size:	900/65 R32	
TireWt (lbs):	32,920	
Road PSI:		
Field PSI:	25	
OnArrival PSI	35.8	



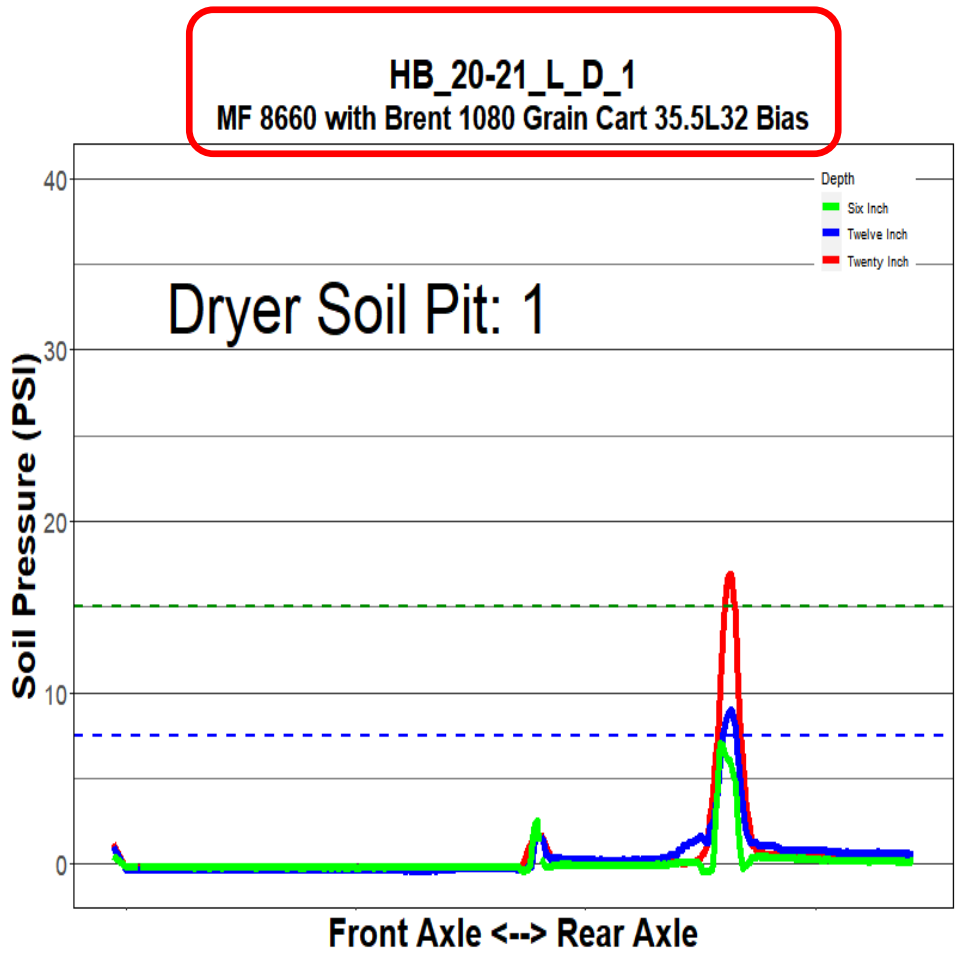
INFO	Inside	Outside
Tire/Trk Make:		
Tire Model:		
Tire Type:		
Tire Size:		
TireWt (lbs):		
Road PSI:		
Field PSI:		
OnArrival PSI		

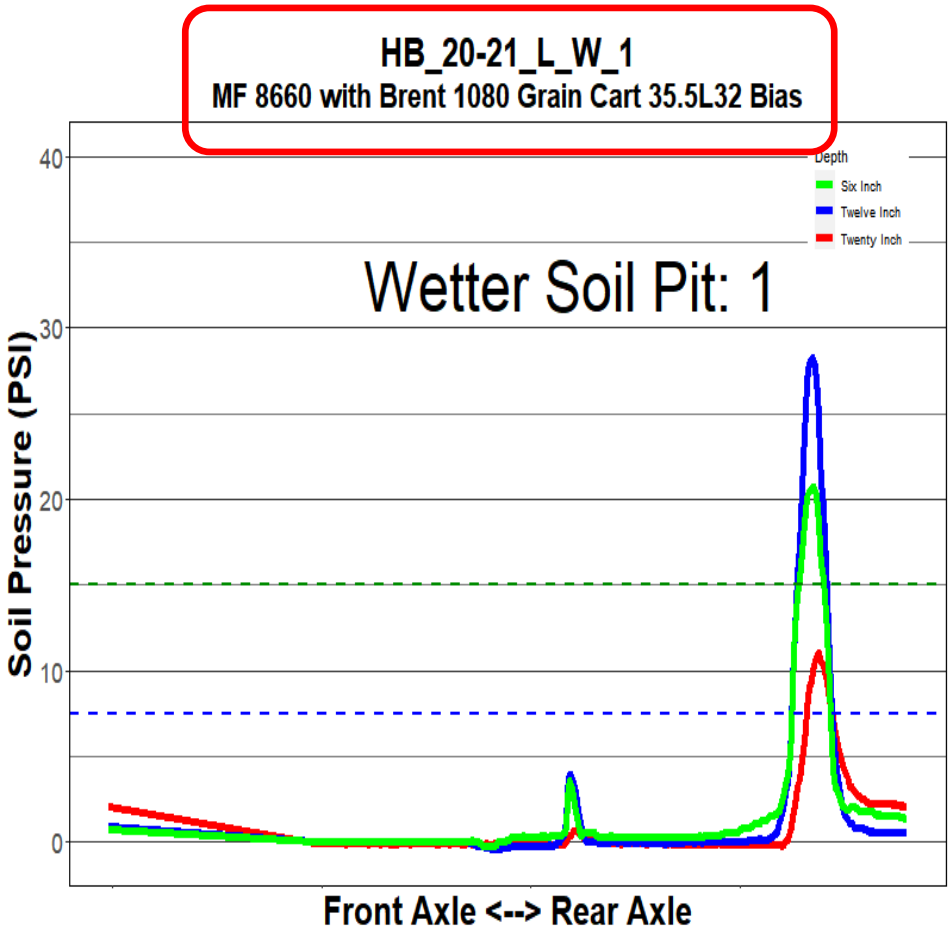
INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	ANS Tractor	
Tire Type:	Bias	
Tire Size:	35.5L32	
TireWt (lbs):	32,320	
Road PSI:		
Field PSI:	36	
OnArrival PSI	32.1	

Grain Buggy - Wheeled

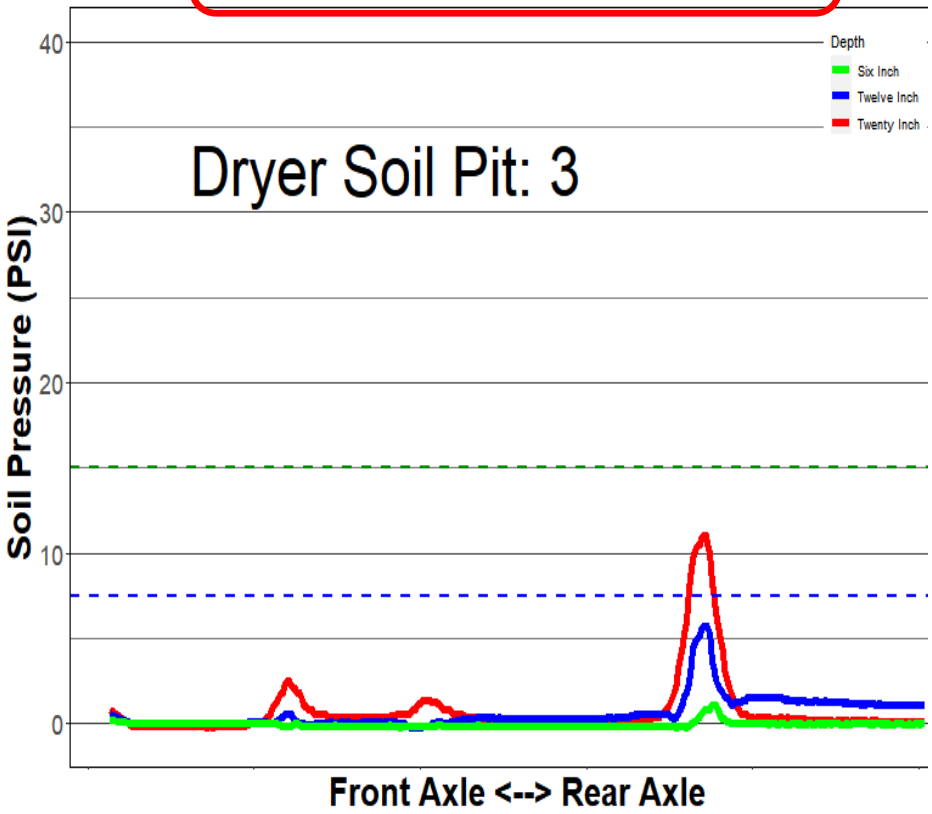
Empty or Loaded?

CTIS: Yes / No?

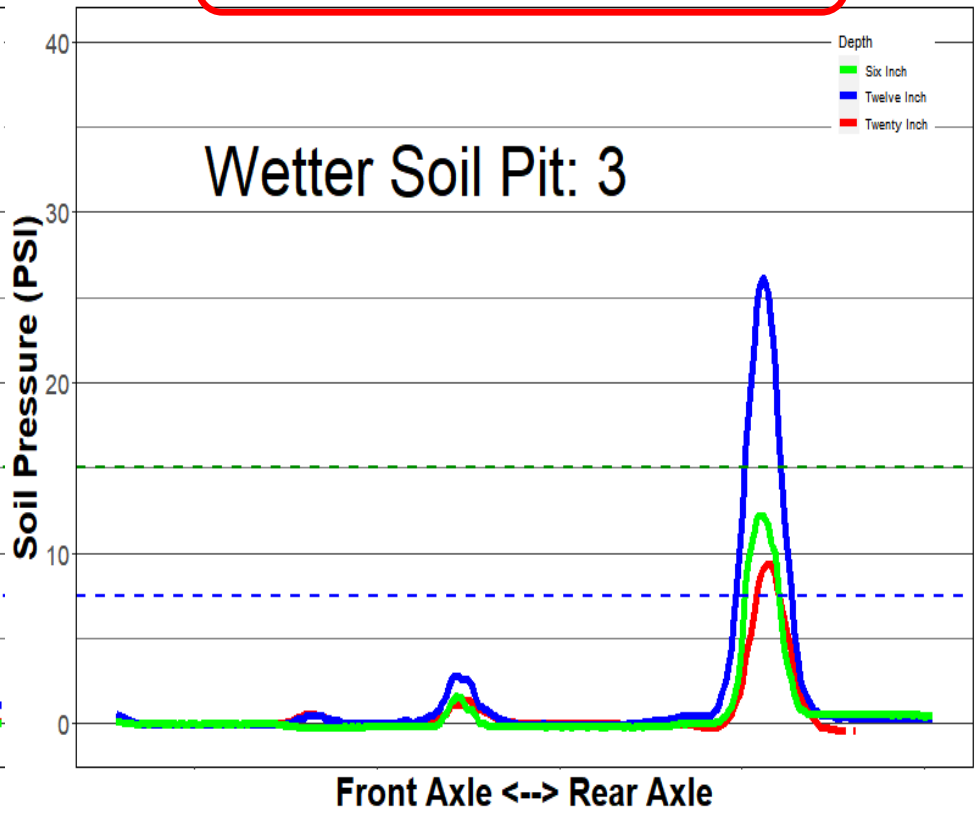

HB_20-21_L_D_1
MF 8660 with Brent 1080 Grain Cart 35.5L32 Bias
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

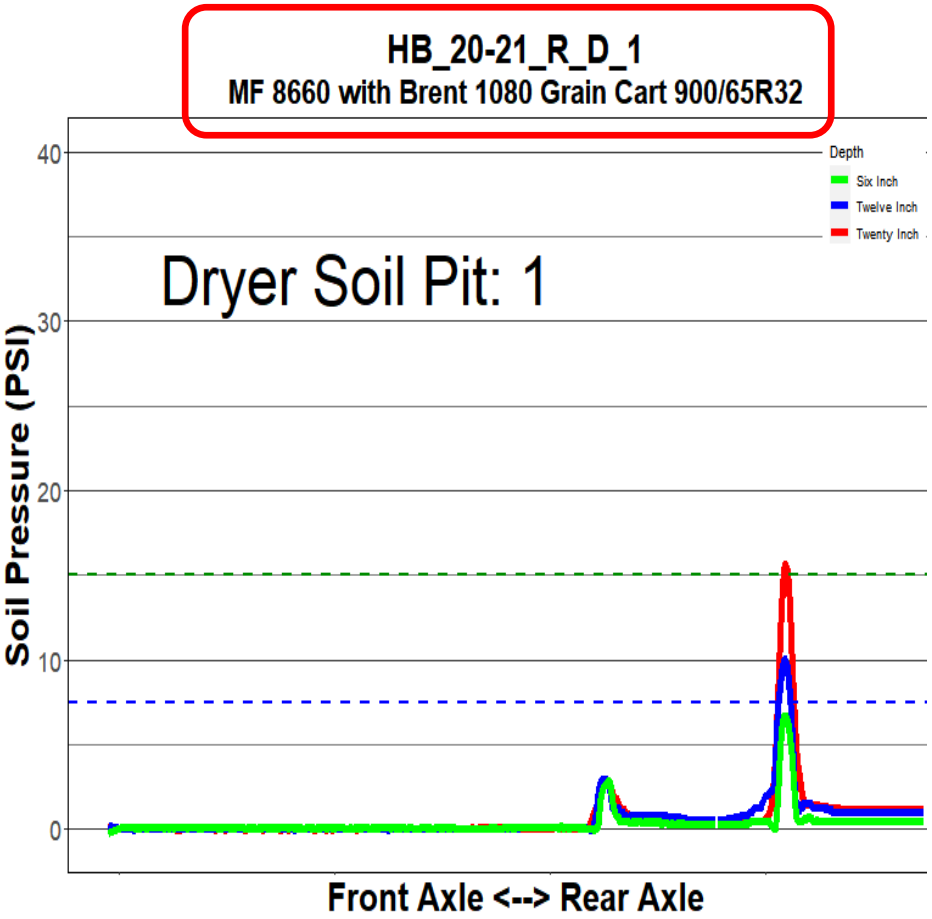

HB_20-21_L_W_1
MF 8660 with Brent 1080 Grain Cart 35.5L32 Bias
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

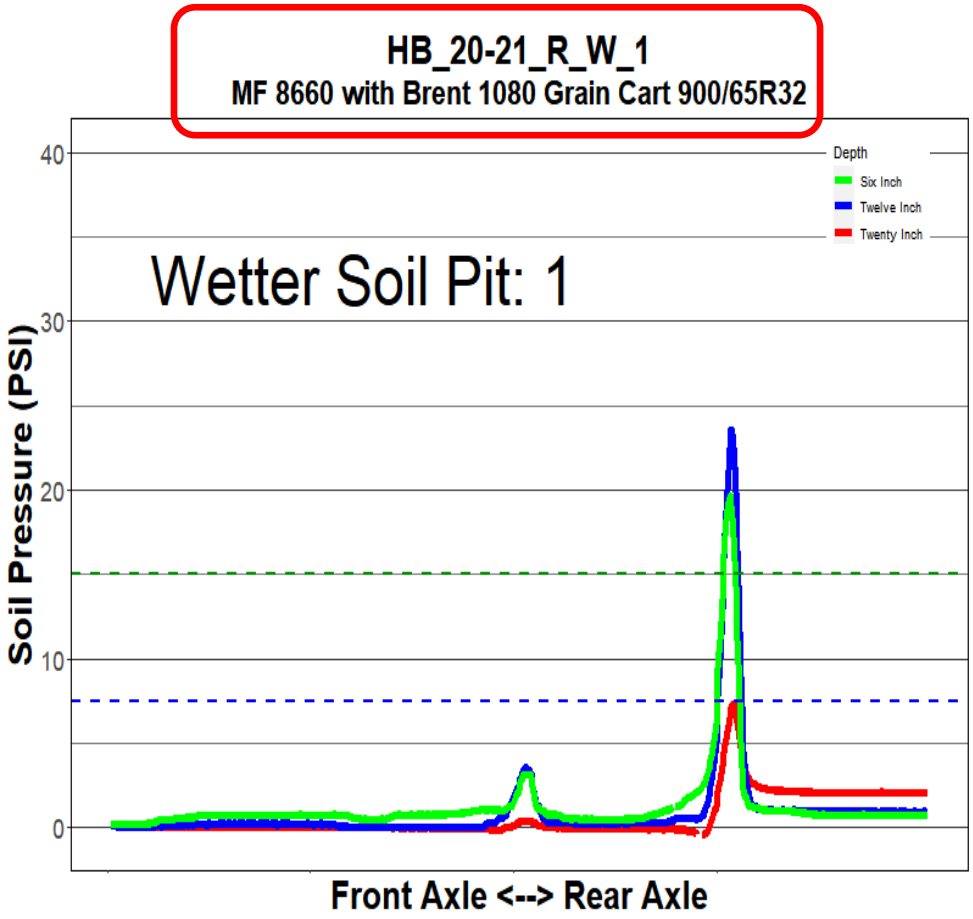
HB_21_L_D_3
MF 8660 with Brent 1080 Grain Cart 35.5L32 Bias



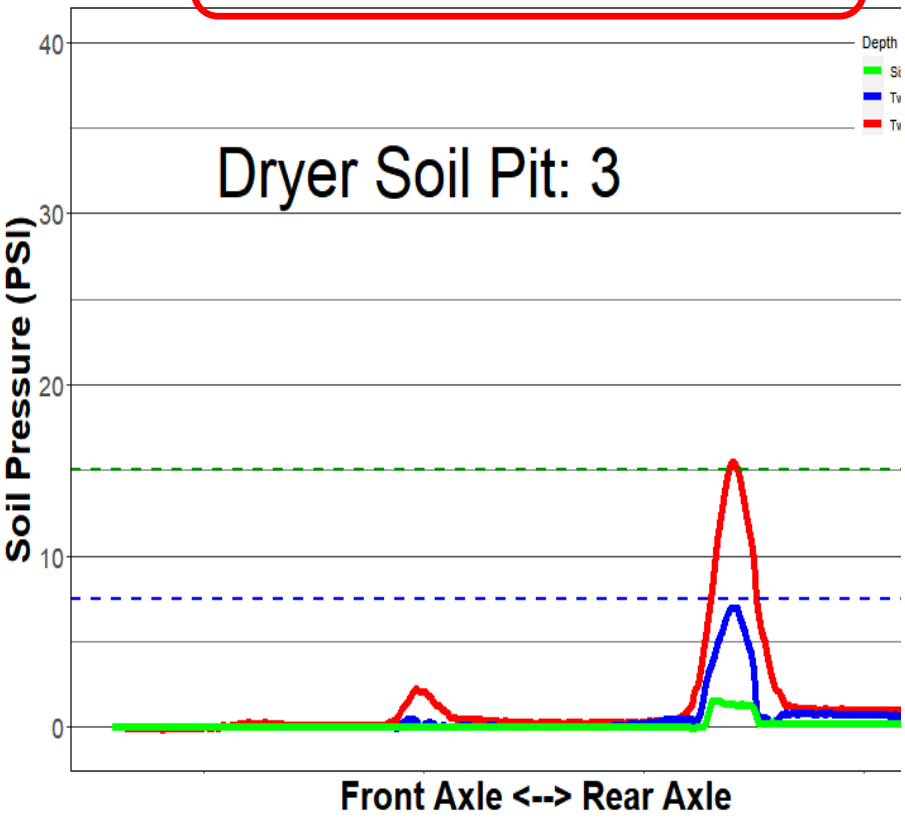
HB_21_L_W_3
MF 8660 with Brent 1080 Grain Cart 35.5L32 Bias



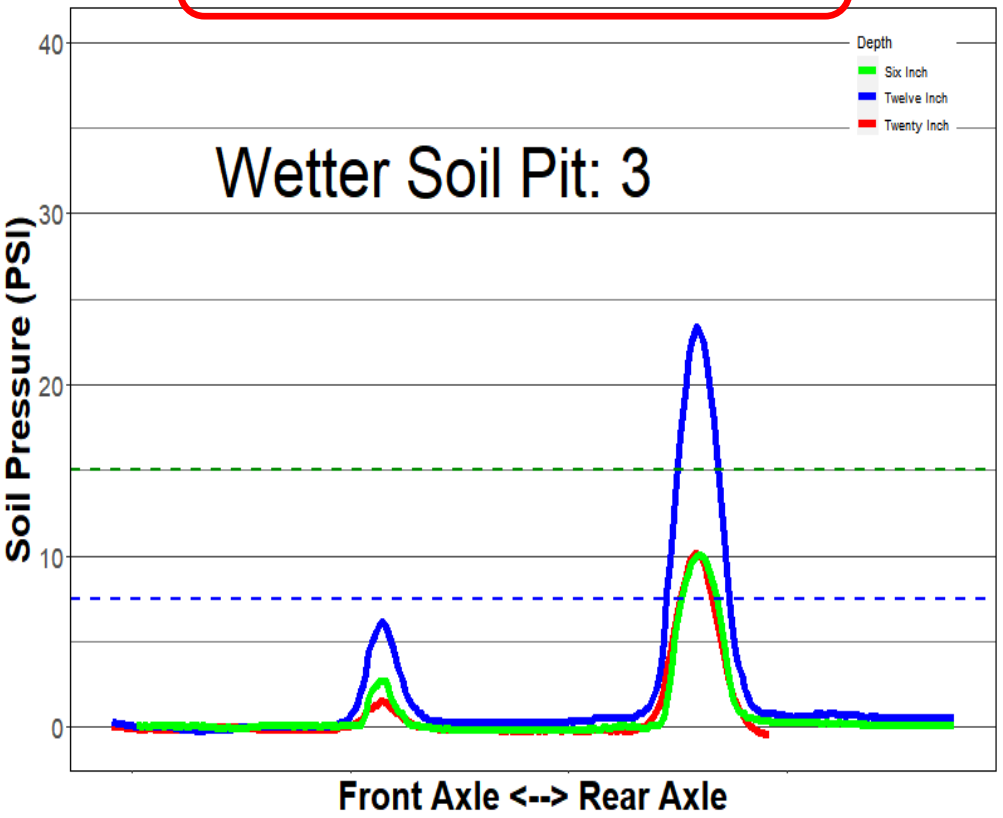

HB_20-21_R_D_1
MF 8660 with Brent 1080 Grain Cart 900/65R32
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

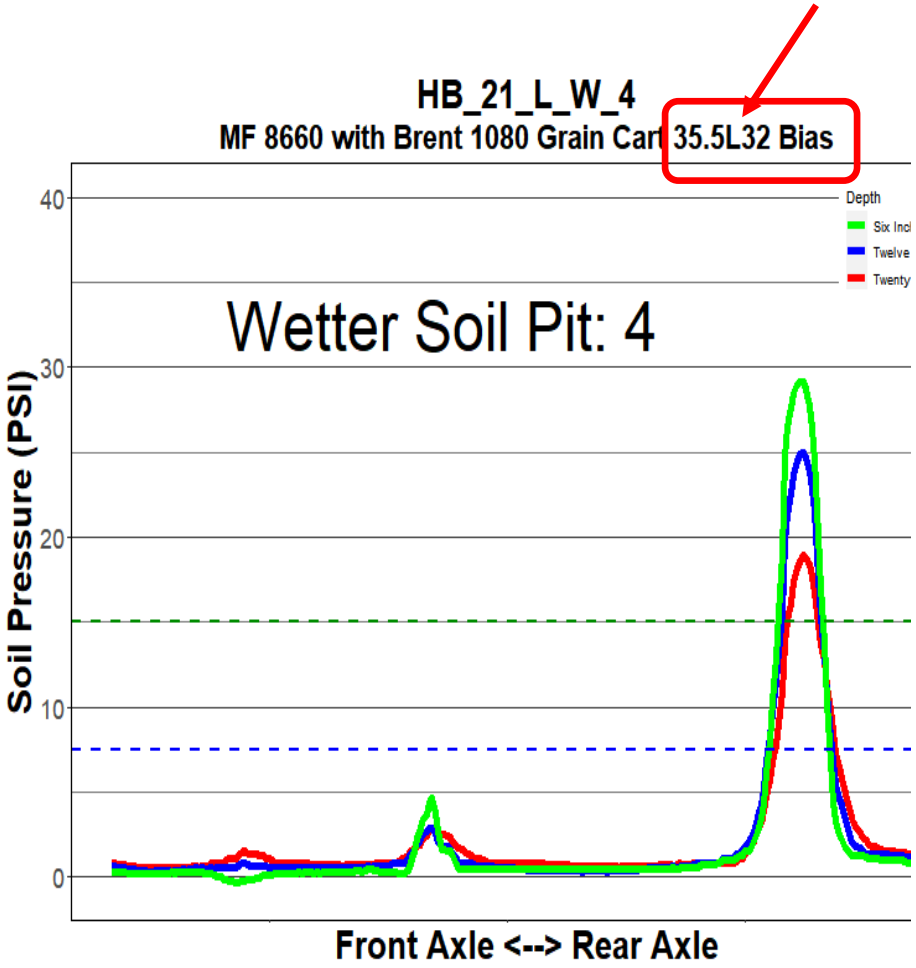

HB_20-21_R_W_1
MF 8660 with Brent 1080 Grain Cart 900/65R32
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

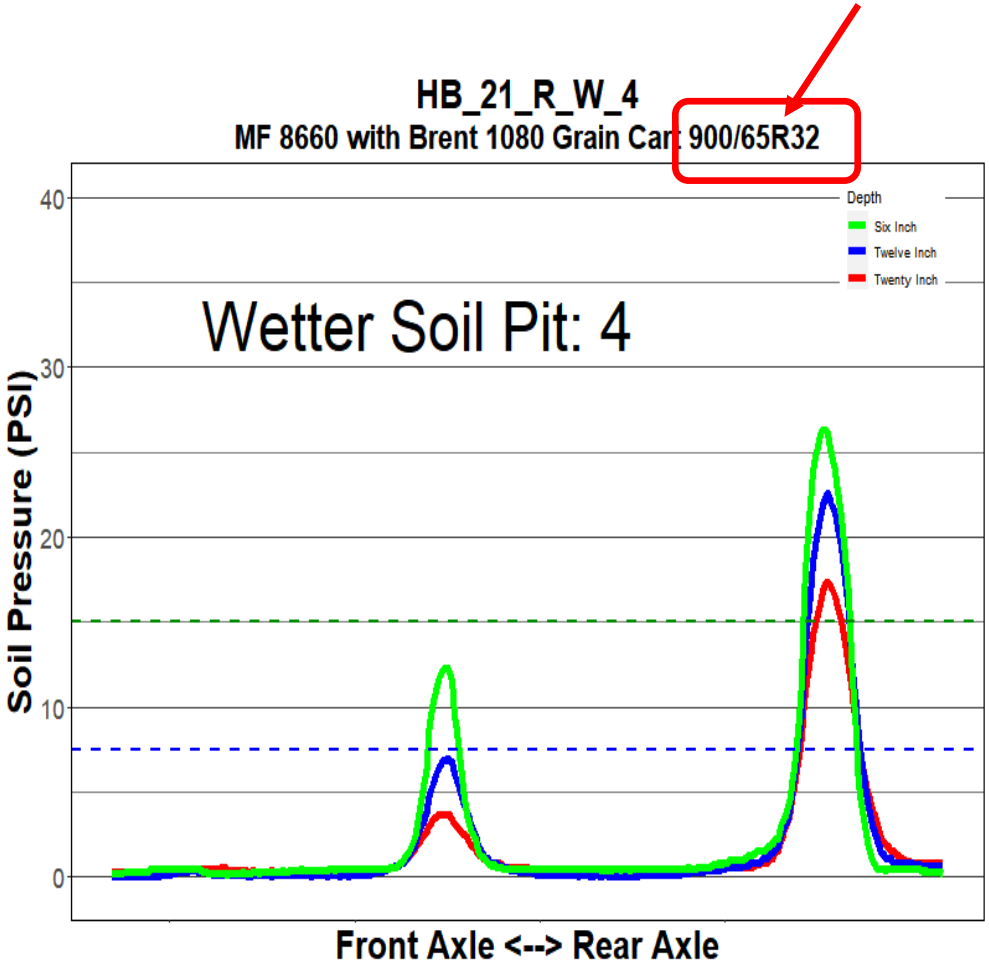
HB_21_R_D_3
MF 8660 with Brent 1080 Grain Cart 900/65R32



HB_21_R_W_3
MF 8660 with Brent 1080 Grain Cart 900/65R32




HB_21_L_W_4
MF 8660 with Brent 1080 Grain Cart 35.5L32 Bias
Depth
Six Inch
Twelve
Twenty
Wetter Soil Pit: 4
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_21_R_W_4
MF 8660 with Brent 1080 Grain Cart 900/65R32
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB20+21

- Unexpected soil response for the 12 and 6 inch stress occurred.
- This is nearing the maximum weight that should be carried on a single tire regardless of the tire as shown by response in both wet and dry pits to the two tire types.
- Big buggies with big loads on single axles are often exceeding the weight that should be put on these configurations.
- The red lines in the dry pits that show so high are from the shallower dry soil being so dense that it transfers the weight imposed stress to wetter soil below at the 20” depth.
- Big weights drive compaction deeper and make it harder to correct. Even buying the best tire available for this size of grain buggy may be too much for the soil, consideration should be given to multiple axles, duals or tracks.
- The other thing about grain buggies, is that as the size increases the load on the soil is great. Consider under poor harvest conditions, you do not have to fill the grain buggy. Farmers don’t like that but it is something to think about.


BRENT


1060
710/70R42




2022 Hamilton-Brant SCIA Compaction Event

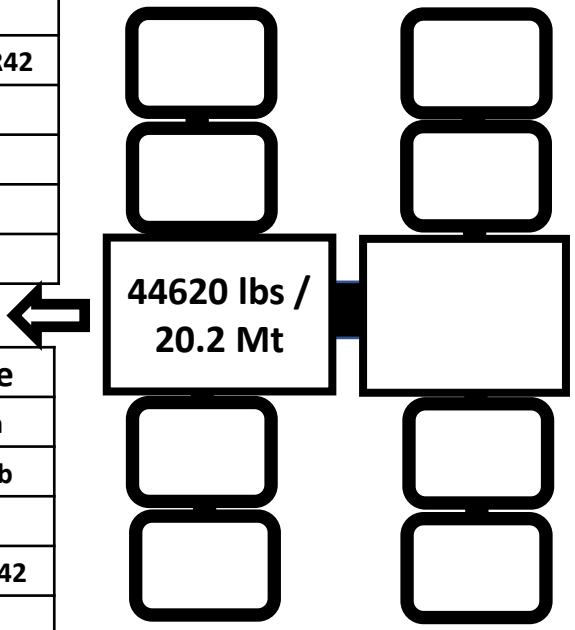
Exhibit: HB22 + HB23
John Deere JD 9330 Articulated Tractor w Dual 710s + J&M 1021 Tracked Grain Cart


9330
JOHN DEERE

Exh#:	HB22	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:	McBlain Farms	OwnerName:	McBlain	Phone#:
EquipType:		Make:	JD	Model: 9330

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	MachXBib	MachXBib
Tire Type:	Radial	Radial
Tire Size:	710/70 R42	110/70 R42
TireWt (lbs):	5000	5640
Road PSI:	7	7
Field PSI:	7	7
OnArrival PSI	10	10

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	MachXBib	MachXBib
Tire Type:	Radial	Radial
Tire Size:	710/70 R42	110/70 R42
TireWt (lbs):	5700	6000
Road PSI:	10	10
Field PSI:		
OnArrival PSI	6.9	6.9



INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	MachXBib	MachXBib
Tire Type:	Radial	Radial
Tire Size:	710/70 R42	110/70 R42
TireWt (lbs):	5000	4980
Road PSI:	7	7
Field PSI:	7	7
OnArrival PSI	10	11

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	MachXBib	MachXBib
Tire Type:	Radial	Radial
Tire Size:	710/70 R42	110/70 R42
TireWt (lbs):	6700	5600
Road PSI:	10	10
Field PSI:	10	10
OnArrival PSI	7.6	7.2

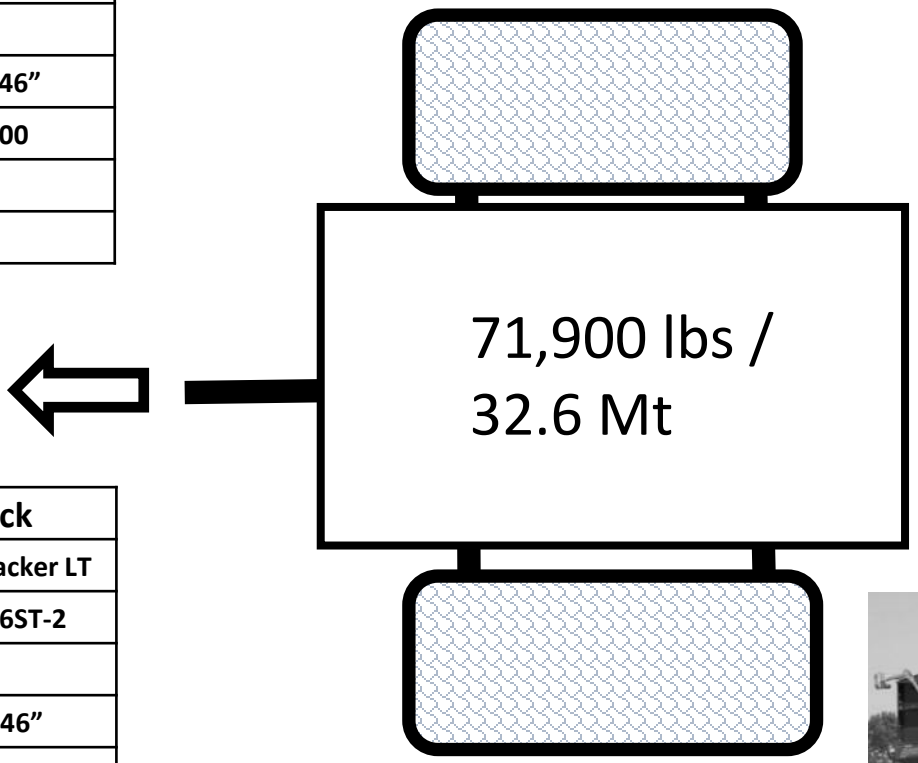
Articulated Wheeled Tractor

CTIS: Yes / No?


10 12 series
X

Exh#:	HB23	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	McBlain	Phone#:
EquipType:	Grain Cart	Make:	J & M with Tracks	Model: 1012 Series

INFO	Track
Tire/Trk Make:	Storm Tracker LT
Tire Model:	3660 36ST-2
Tire Type:	
Tire Size:	36x146”
TireWt (lbs):	31,900
Road PSI:	
Field PSI:	

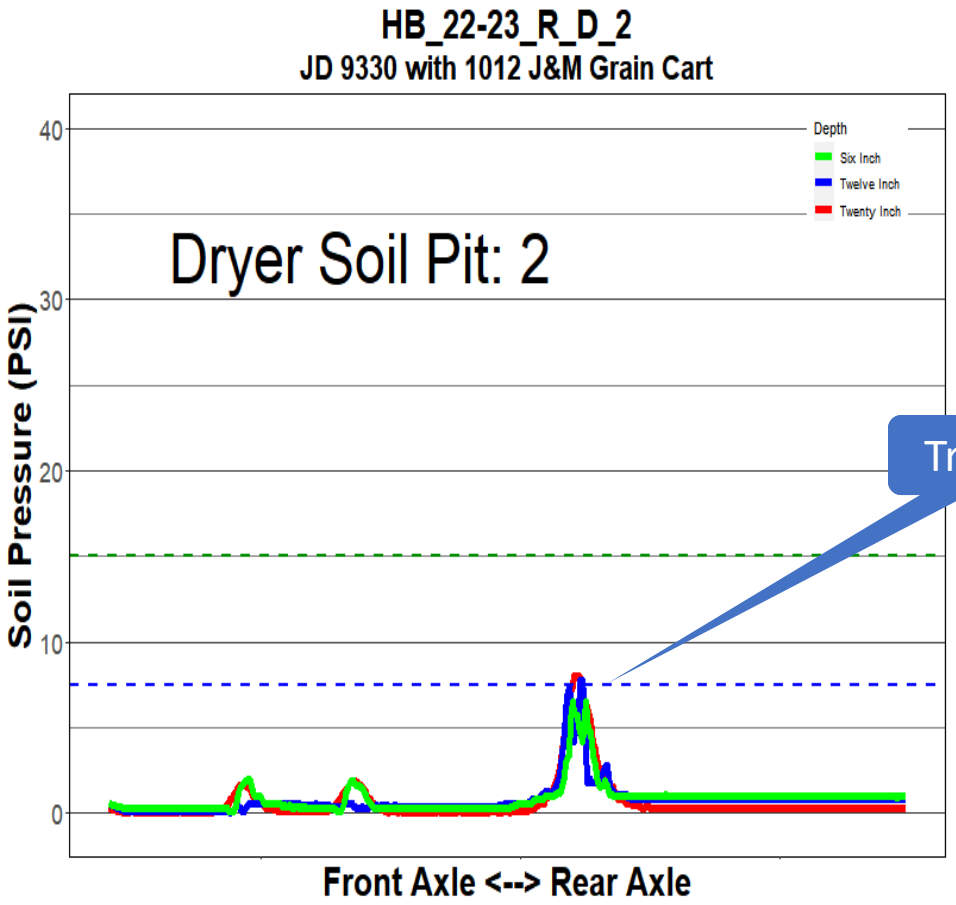


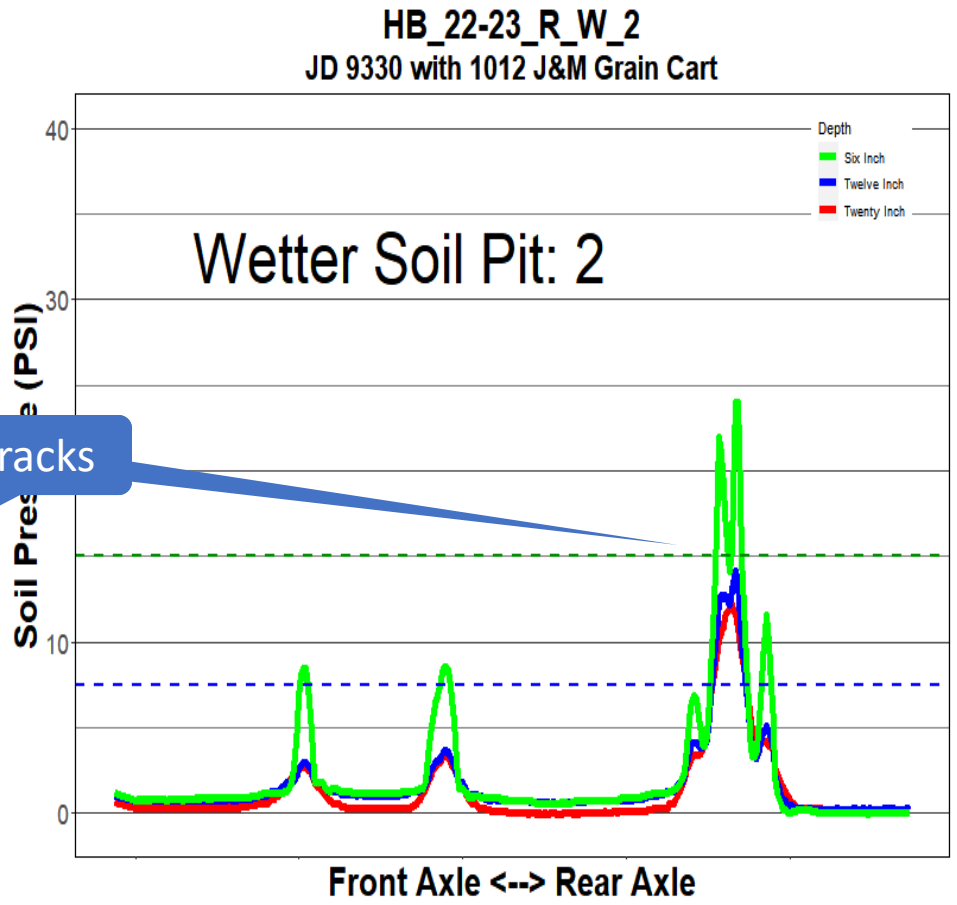
INFO	Track
Tire/Trk Make:	Storm Tracker LT
Tire Model:	3660 36ST-2
Tire Type:	
Tire Size:	36x146”
TireWt (lbs):	40,000
Road PSI:	
Field PSI:	

Grain Buggy - Tracked

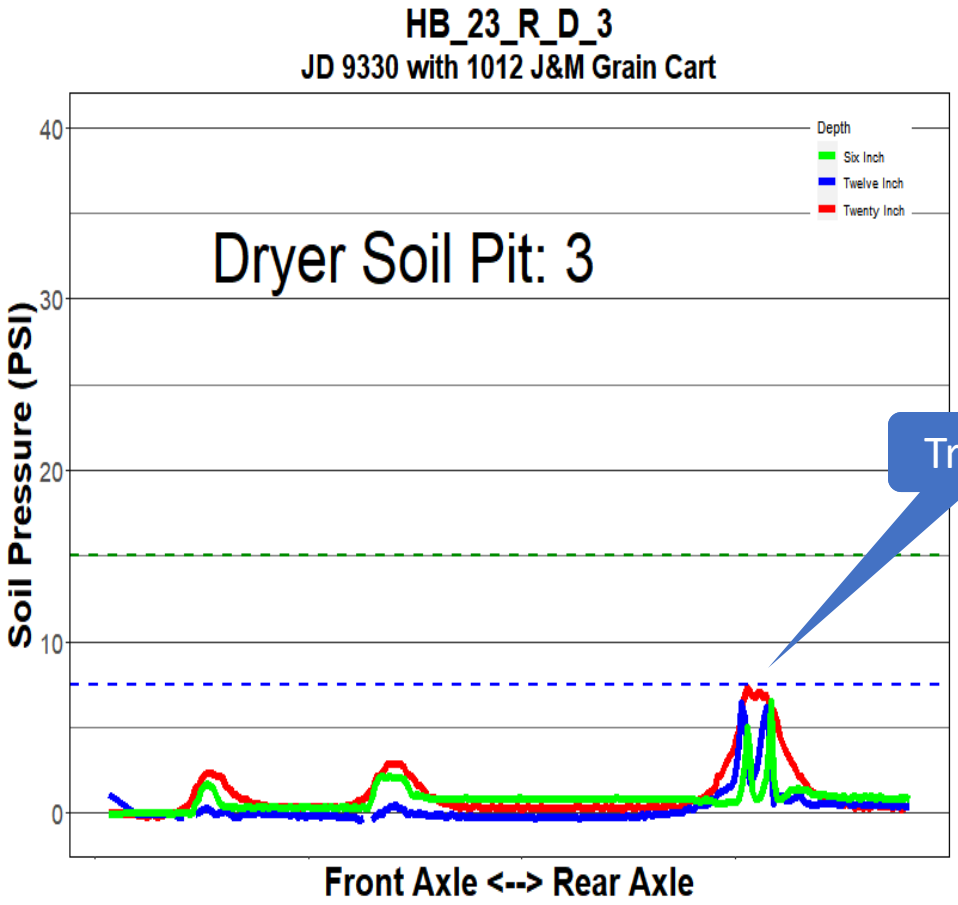
Empty or Loaded?

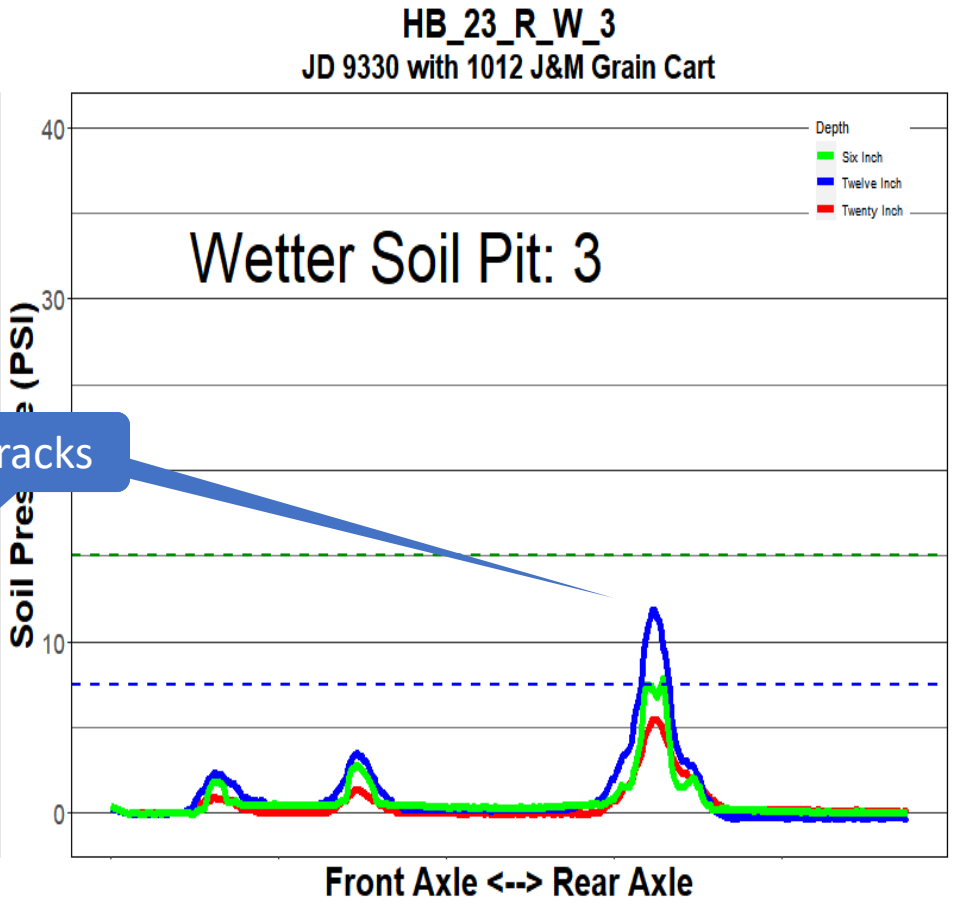
CTIS: Yes / No?


HB_22-23_R_D_2
JD 9330 with 1012 J&M Grain Cart
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

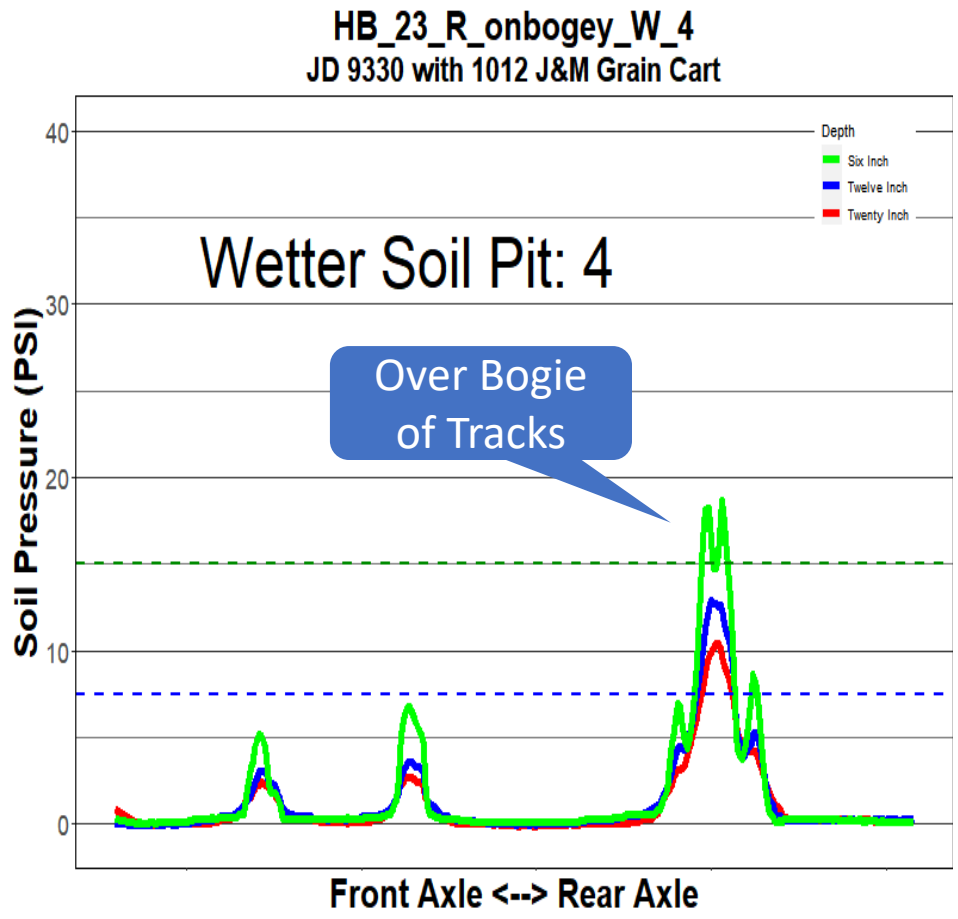

HB_22-23_R_W_2
JD 9330 with 1012 J&M Grain Cart
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
40
30
10
0
Front Axle <--> Rear Axle

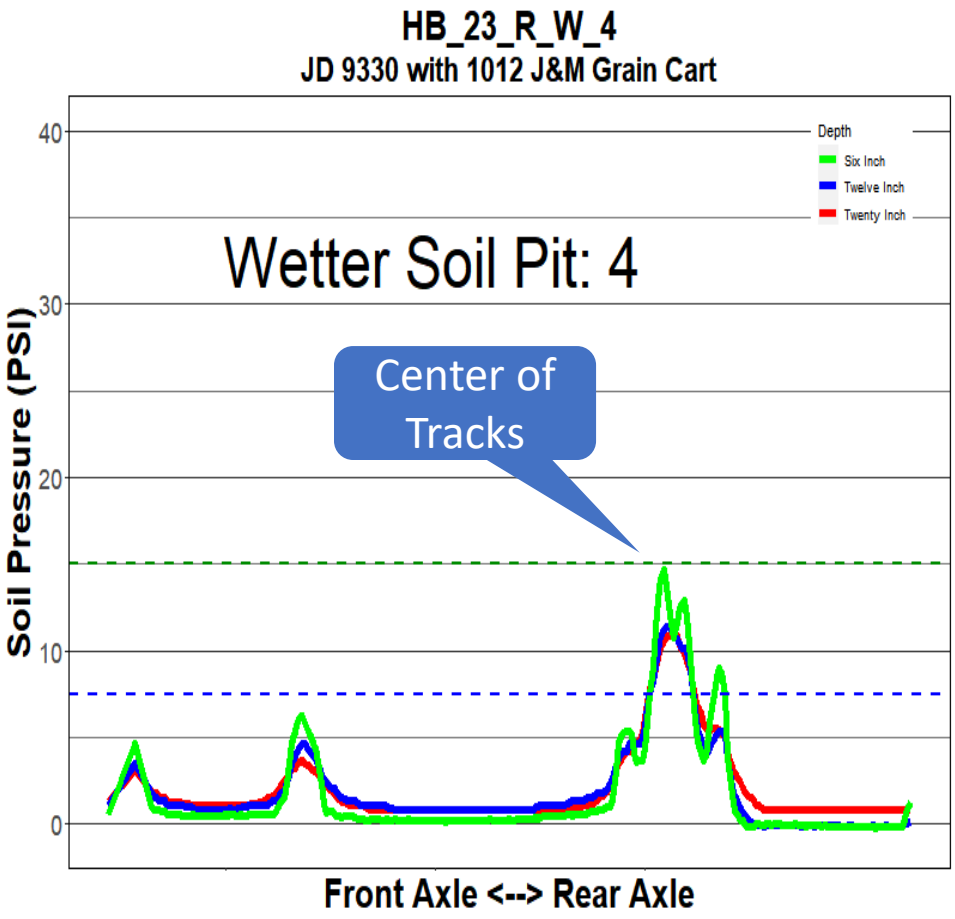
Tracks


HB_23_R_D_3
JD 9330 with 1012 J&M Grain Cart
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_23_R_W_3
JD 9330 with 1012 J&M Grain Cart
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
40
30
10
0
Front Axle <--> Rear Axle

Tracks


HB_23_R_onbogey_W_4
JD 9330 with 1012 J&M Grain Cart
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
Over Bogie of Tracks
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_23_R_W_4
JD 9330 with 1012 J&M Grain Cart
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
Center of Tracks
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB22 + HB23

- Significant axle weight showing high stress, especially in the subsoil.
- Tracks are likely better suited to this amount of weight on one axle but although they go through more “crap”, they still have the same or greater potential for deep compaction.
- Note that in dry pits the stress transferred downward is less than in wet conditions. Soils are better able to handle the stress suggesting that grain buggies of this size are suitable during cereal harvest, but more caution needs to be taken when filling these full during wet fall harvests.
- Not that the responses differ by pit number suggesting significant soil differences in the profile within close proximity to each other making choices more difficult in terms of potential for soil compaction reduction with better or more tires or lower weight.


JOHN DEERE


X1012
J&M


NUHN


J&M


J&M

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB24+25

John Deere JD RC Loader Tractor + Burns 400 Gravity Wagon 425 vs 315 Radials

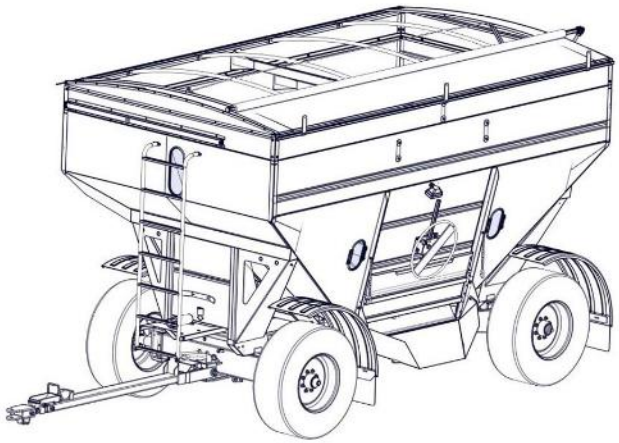

425/65R22.5
HB25
HORST
315/80R22.5

Exh#:	HB25	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Murry	Phone#:
EquipType:	Gravity Wagon - Corn	Make:	Bruns	Model: 400

INFO	Inside	Outside
Tire/Trk Make:	RoadX	
Tire Model:	DX770	
Tire Type:	Radial	
Tire Size:	425/65 R22.5	
TireWt (lbs):	5740	
Road PSI:	70	
Field PSI:	70	
OnArrival PSI	86	

Empty or Loaded?

Loaded with corn



INFO	Inside	Outside
Tire/Trk Make:	Triangle	
Tire Model:	TR678	
Tire Type:	Radial	
Tire Size:	425/65 R22.5	
TireWt (lbs):	7320	
Road PSI:	70	
Field PSI:	70	
OnArrival PSI	88	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	HP3000 LP	
Tire Type:	Radial	
Tire Size:	315/80 R22.5	
TireWt (lbs):	6500	
Road PSI:	105	
Field PSI:	105	
OnArrival PSI	79.8	

INFO	Inside	Outside
Tire/Trk Make:	Kumho	
Tire Model:	Powerfleet	
Tire Type:	Radial	
Tire Size:	11 R22.5	
TireWt (lbs):	6320	
Road PSI:	105	
Field PSI:	105	
OnArrival PSI	78	

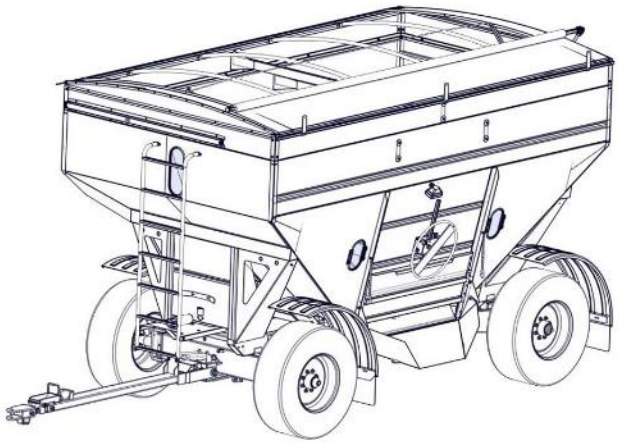
CTIS: Yes / No?

Exh#:	HB25	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Murry	Phone#:
EquipType:	Gravity Wagon - Corn	Make:	Bruns	Model: 400

INFO	Inside	Outside
Tire/Trk Make:	RoadX	
Tire Model:	DX770	
Tire Type:		
Tire Size:	425/65R22.5	
TireWt (lbs):	6500	
Road PSI:	70	
Field PSI:	70	
OnArrival PSI	72	

Empty or Loaded?

Loaded with Wheat



INFO	Inside	Outside
Tire/Trk Make:	Triangle	
Tire Model:	TR678	
Tire Type:		
Tire Size:	425/65R22.5	
TireWt (lbs):	6420	
Road PSI:	70	
Field PSI:	70	
OnArrival PSI	71	

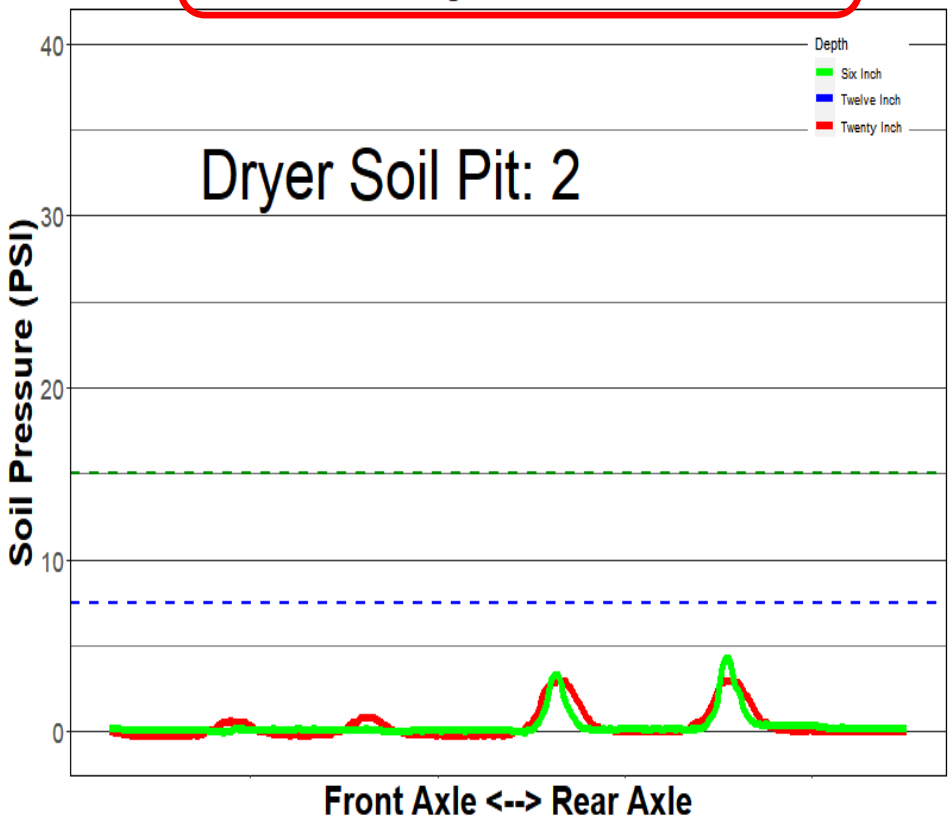
INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	HP3000 LP	
Tire Type:	Radial	
Tire Size:	315/80 R22.5	
TireWt (lbs):	6100	
Road PSI:	105	
Field PSI:	105	
OnArrival PSI	78	

INFO	Inside	Outside
Tire/Trk Make:	Kumho	
Tire Model:	Powerfleet	
Tire Type:		
Tire Size:	11 R22.5	
TireWt (lbs):	6780	
Road PSI:	105	
Field PSI:	105	
OnArrival PSI	78	

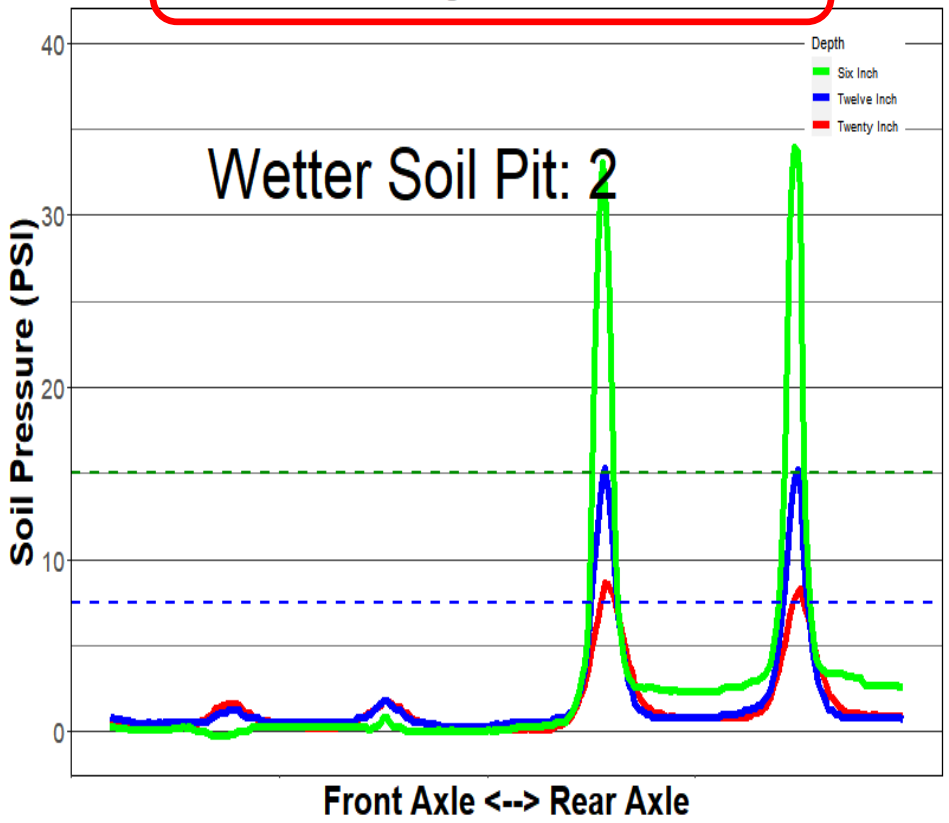
CTIS: Yes / No

Fr-315/80 R22.5 + Rr-11 R22.5 @ 105 psi

HB_25_L_D_2
Bruns 400 Grain Wagon 315/80R22.5 and 11 R22.5

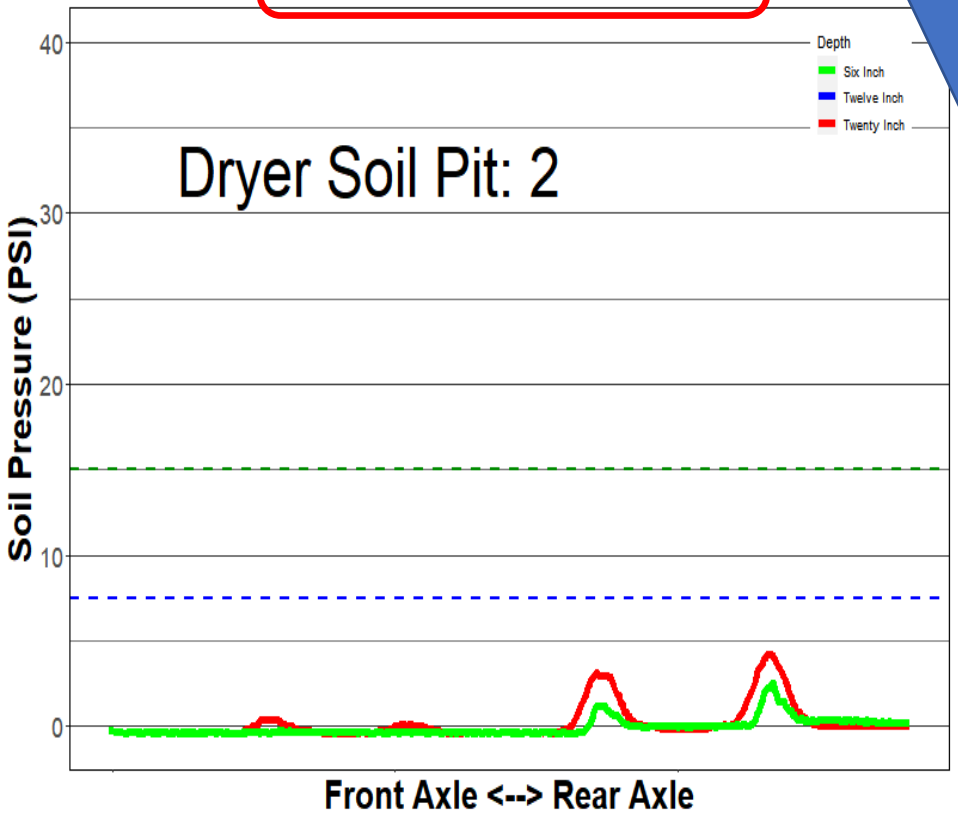


HB_25_L_Wagon_W_2
Bruns 400 Grain Wagon 315/80R22.5 and 11 R22.5

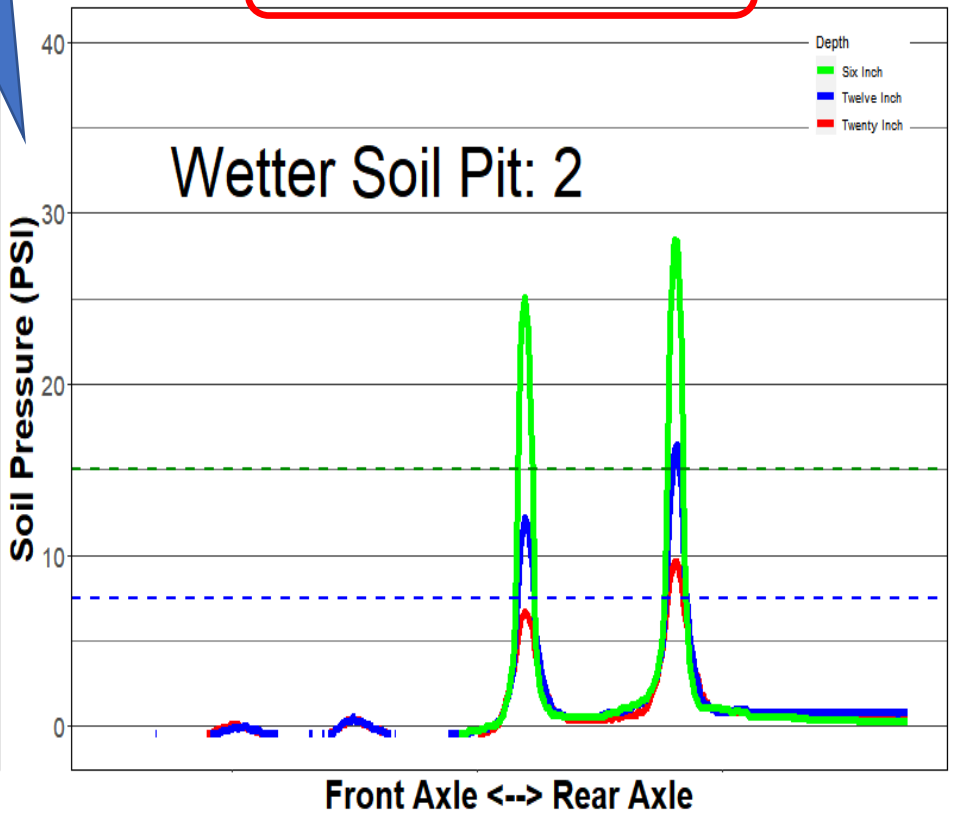


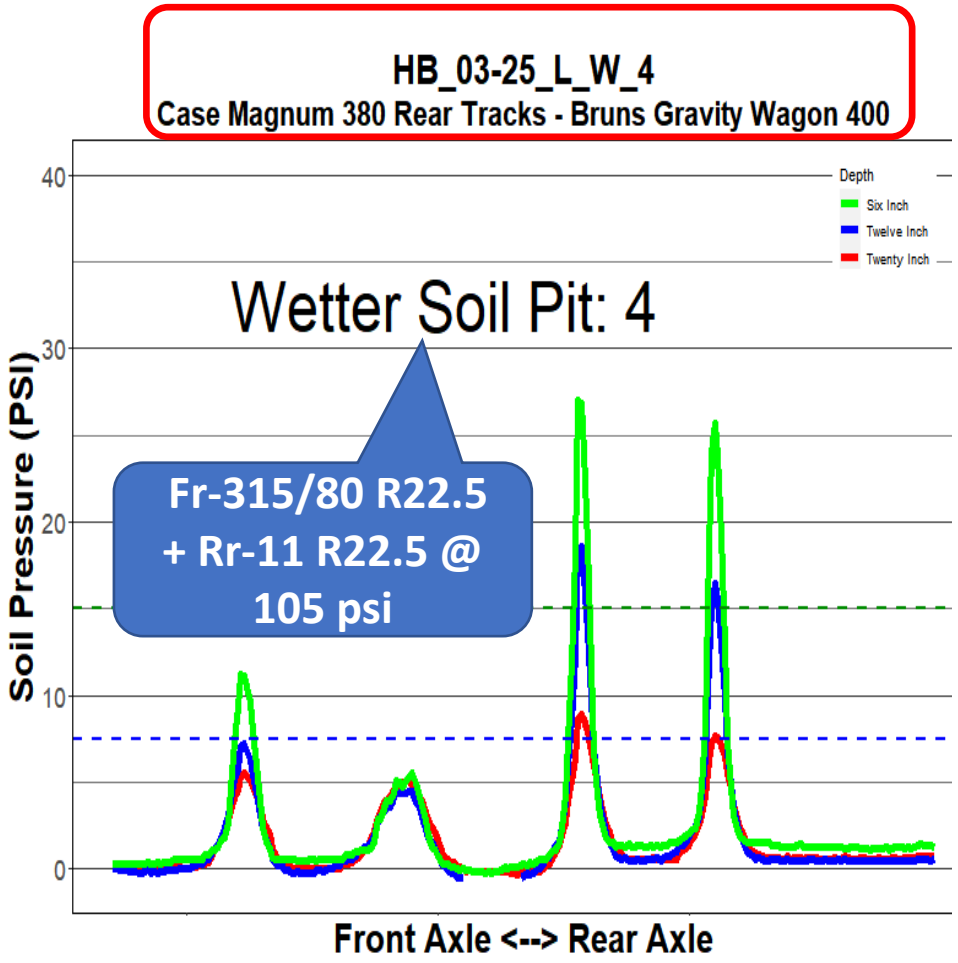
425/65R22.5 @ 75psi

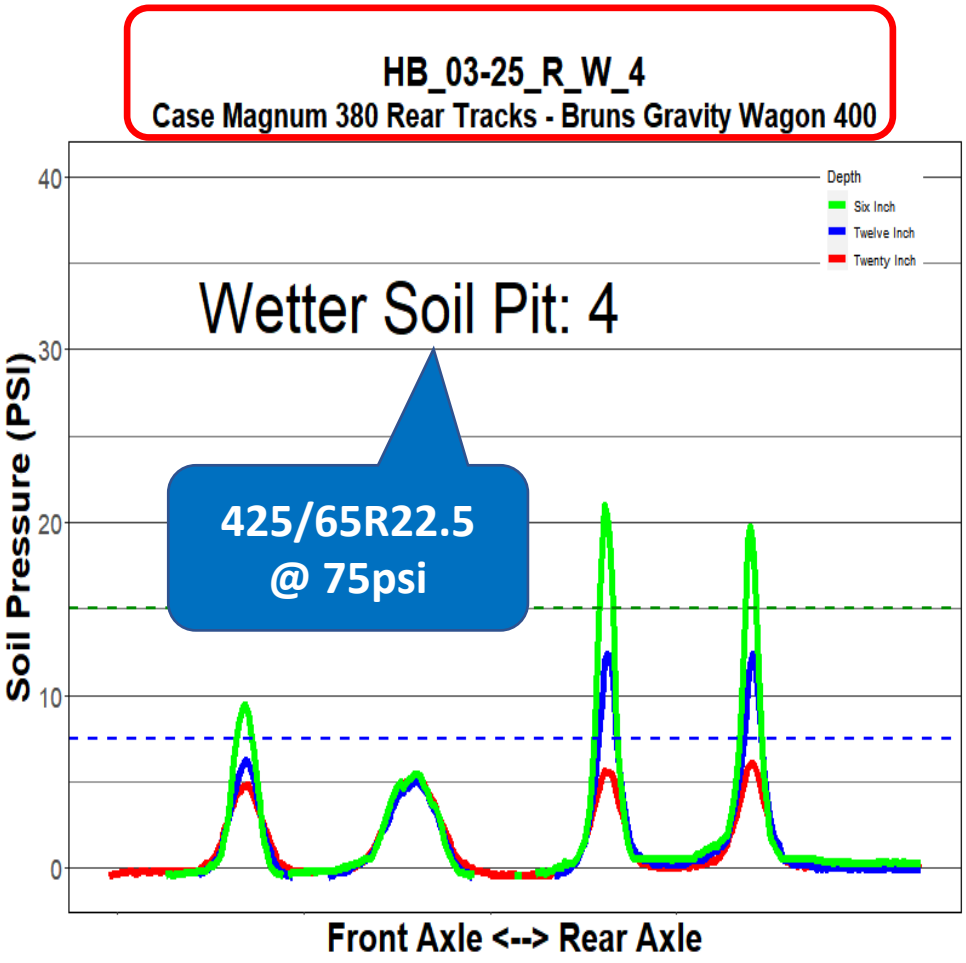
HB_25_R_D_2
Bruns 400 Grain Wagon 425/65R22.5



HB_25_R_Wagon_W_2
Bruns 400 Grain Wagon 425/65R22.5




HB_03-25_L_W_4
Case Magnum 380 Rear Tracks - Bruns Gravity Wagon 400
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
Fr-315/80 R22.5
+ Rr-11 R22.5 @
105 psi
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_03-25_R_W_4
Case Magnum 380 Rear Tracks - Bruns Gravity Wagon 400
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
425/65R22.5
@ 75psi
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB25

- Gravity Wagons are not suited to being in the field when fully loaded. The tire size and required inflation pressure are not a good combination.
- Note the difference in recommended tire PSI between the two tire sizes (70 vs 105 for 425 vs 315). Even with this PSI differential, even the bigger tire is over capacity to manage this load on wet soils.
- Gravity wagons should be kept as close to field entrances as possible.
- This configuration really shows the soil wetness impact on soil compaction threat when tire size and weight are not appropriate for the conditions.


HB25
HORST


425/65


JOHN DEERE
HB25


BRUNS

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB27
John Deere JD RC Loader Tractor + Forage Wagon Mimic with Hay Rack


JOHN DEERE

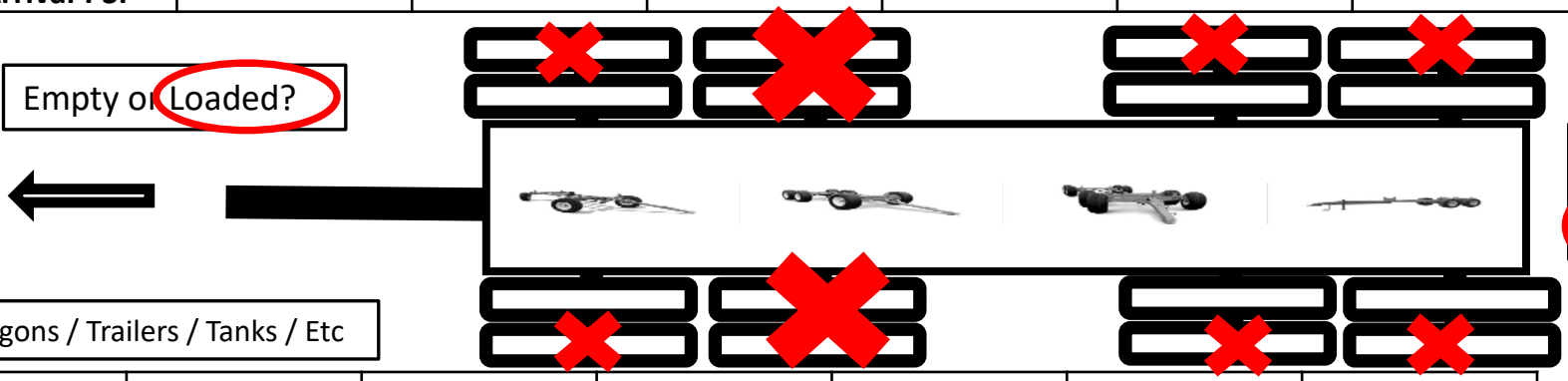
Forage Wagon Mimic

- During haylage season a loaded forage wagon was weighed and a full recording of each individual tire weight was taken.
- At event date, a bale flat rack with similar running gear (single front, tandem rear axles) to the forage box was loaded with big square bales and cement blocks to approximate the weight of the filled forage box.

Exh#:		ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Alblas	Phone#:
EquipType:	Forage Wagon Mimic		Make: ?	Model: ?

INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Galaxy		Titan	Titan		
Tire Model:	High Field Rated		Farm Service	Farm Service		
Tire Type:	Bias		Bias	Bias		
Tire Size:	12.5L15		11L-15SL	11L-15SL		
TireWt (lbs):	4940		3460	3480		
Road PSI:	36		36	36		
Field PSI:						
OnArrival PSI	33		38	21		

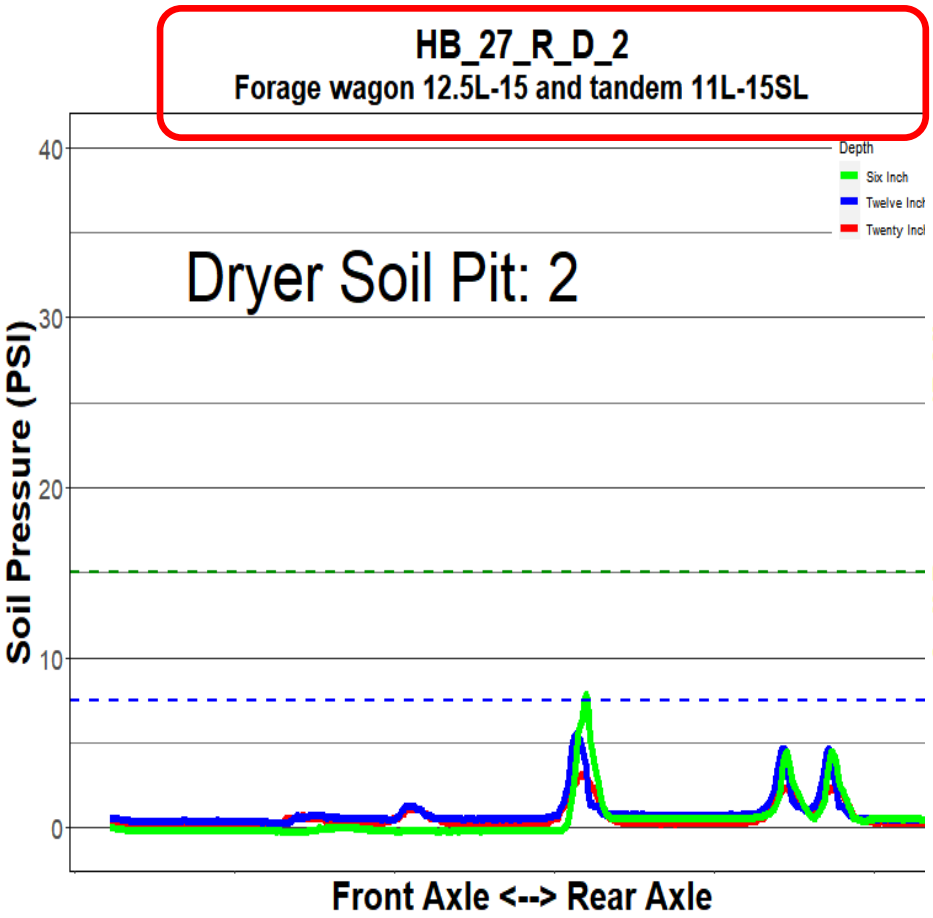
Empty or Loaded?

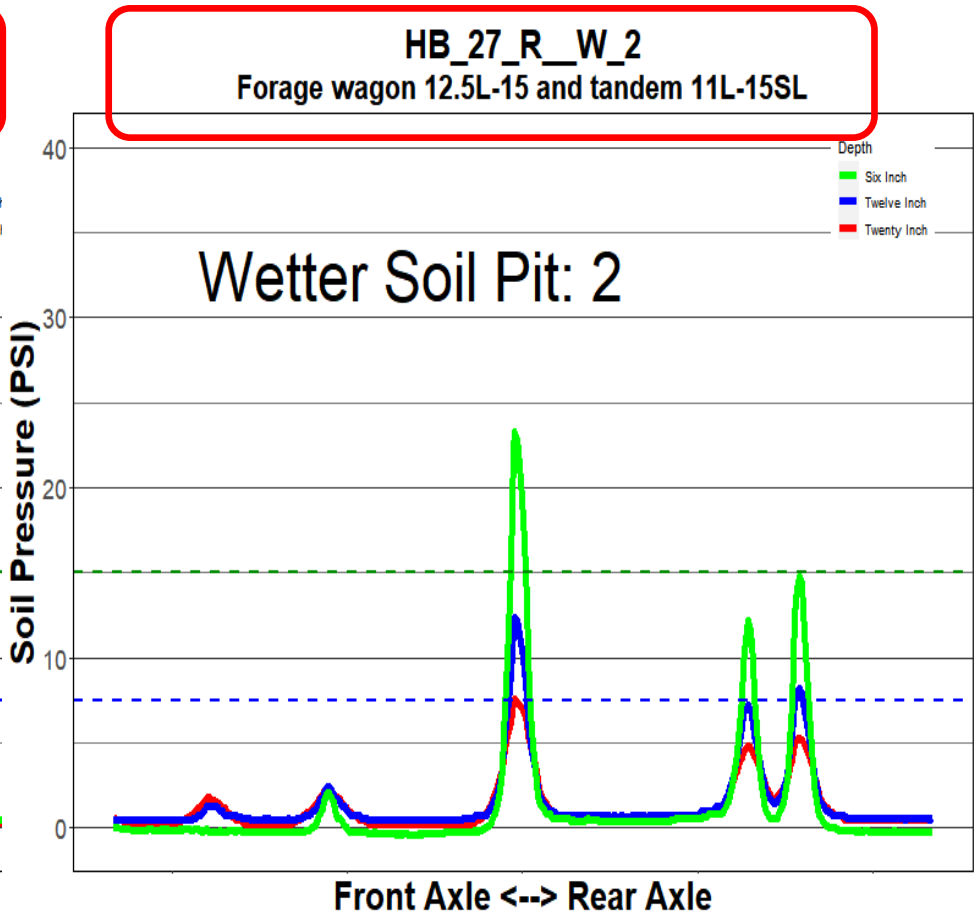


CTIS: Yes / No

Large Wagons / Trailers / Tanks / Etc

INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Galaxy		Titan	Kodiak LT		
Tire Model:	High Field Rated		Farm Service	Gillette		
Tire Type:	Bias		Bias	Bias		
Tire Size:	12.5L15		11L-15SL	11L-15SL		
TireWt (lbs):	5000		2500	2700		
Road PSI:	36		36	36		
Field PSI:						
OnArrival PSI:	45		38	42.5		


HB_27_R_D_2
Forage wagon 12.5L-15 and tandem 11L-15SL
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_27_R__W_2
Forage wagon 12.5L-15 and tandem 11L-15SL
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB27

- This is a decent demonstration showing how tandem axles share the weight. The front axle is approximately double the weight and thus results in much higher stress on the soil.
- Haylage harvesting can occur under wetter conditions than expected to secure feed quality and thus the importance of soil compaction reducing configurations are important.
- Forage stands that are intended for 3-4 years that receive significant compaction early in their cycle impact field yield and performance over the life of the forage stand.


JOHN DEERE

2022 Hamilton-Brant SCIA Compaction Event

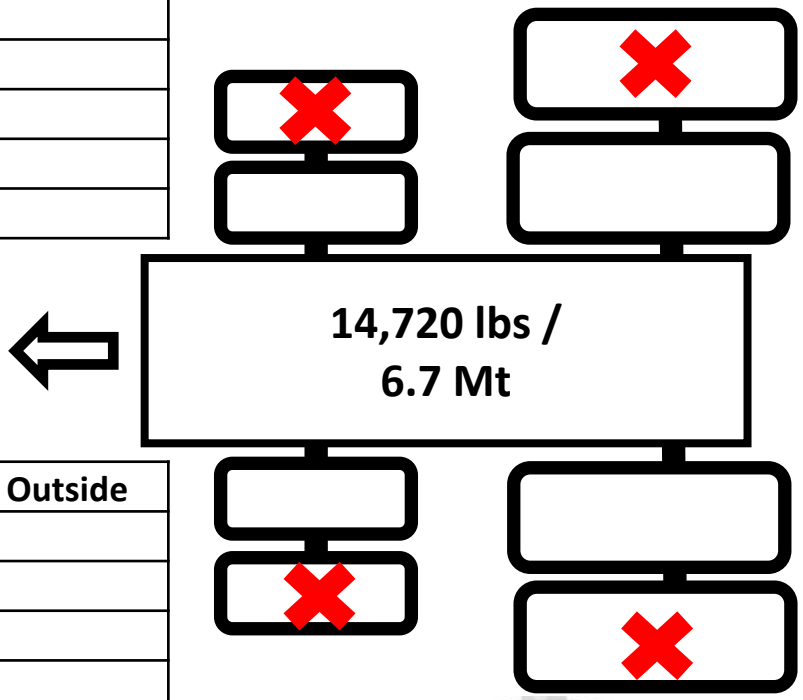
Exhibit: HB28 + HB29
John Deere 6430 Row Crop Loader Tractor and Pull Type Tandem Boom Sprayer w Bias Tires


JOHN DEERE
673
Self-Leveling

Exh#:	HB28	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Sickle	Phone#:
EquipType:	Loader	Make:	John Deere	Model: RC 6430

INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Agrimax	
Tire Type:	RT765	
Tire Size:	380/70 R28	
TireWt (lbs):	3720	
Road PSI:	22	
Field PSI:	17	
OnArrival PSI	17.9	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	Traction 23	
Tire Type:		
Tire Size:	480/80 R38	
TireWt (lbs):	3800	
Road PSI:	15	
Field PSI:	7	
OnArrival PSI	16.9	



INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Agrimax	
Tire Type:	RT765	
Tire Size:	380/70 R28	
TireWt (lbs):	3700	
Road PSI:	22	
Field PSI:	17	
OnArrival PSI	17.9	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	Traction 23	
Tire Type:		
Tire Size:	480/80 R38	
TireWt (lbs):	3500	
Road PSI:	15	
Field PSI:	7	
OnArrival PSI	16.4	

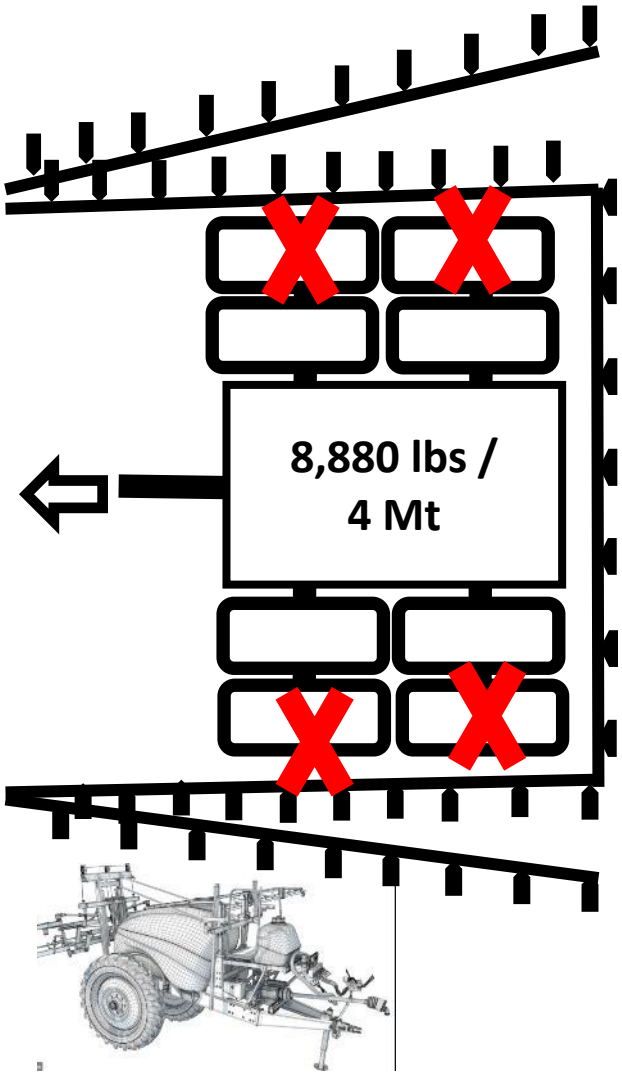
Row Crop Tractor - Wheeled

CTIS: Yes / No?


PRECISION

Exh#:	HB29	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Court	Phone#:
EquipType:	Pull type sprayer		Make: Precision	Model:

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:		
Tire Type:		
Tire Size:	11L15	
TireWt (lbs):	2320	
Road PSI:	36	
Field PSI:		
OnArrival PSI	27	



INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:		
Tire Type:		
Tire Size:	11L15	
TireWt (lbs):	2360	
Road PSI:	36	
Field PSI:		
OnArrival PSI	27.6	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:		
Tire Type:		
Tire Size:	11L15	
TireWt (lbs):	2100	
Road PSI:	36	
Field PSI:		
OnArrival PSI	26.9	

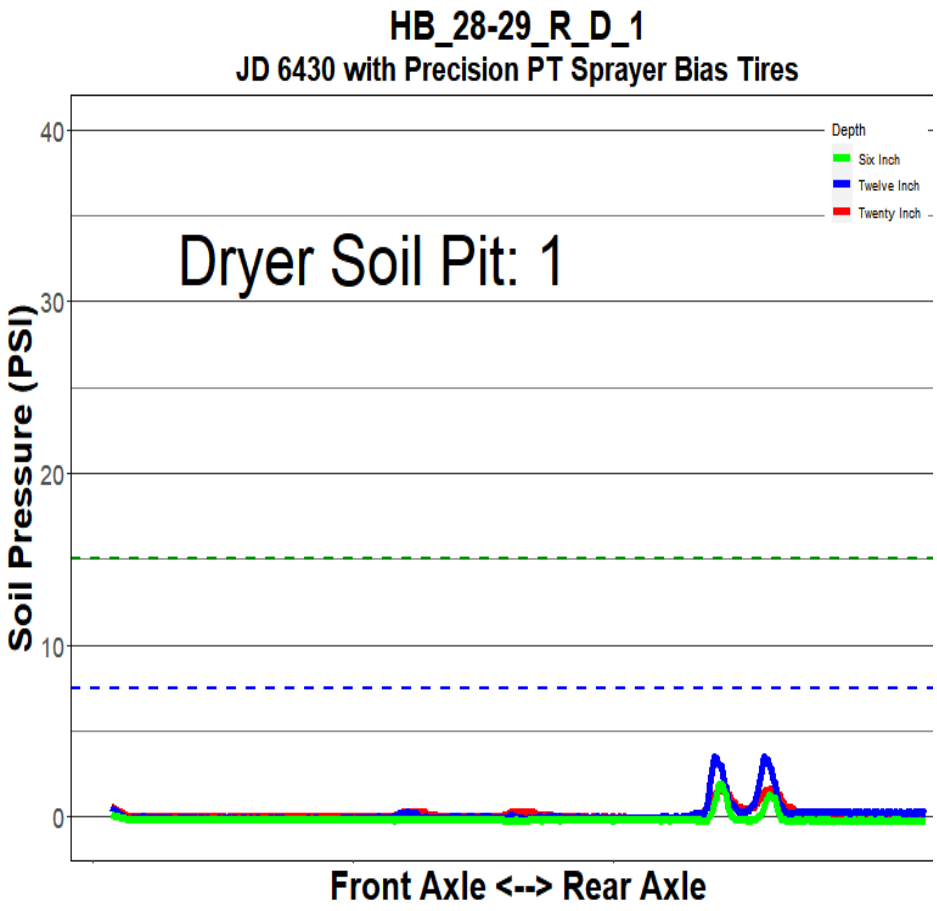
INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:		
Tire Type:		
Tire Size:	11L15	
TireWt (lbs):	2100	
Road PSI:	36	
Field PSI:		
OnArrival PSI	32.1	

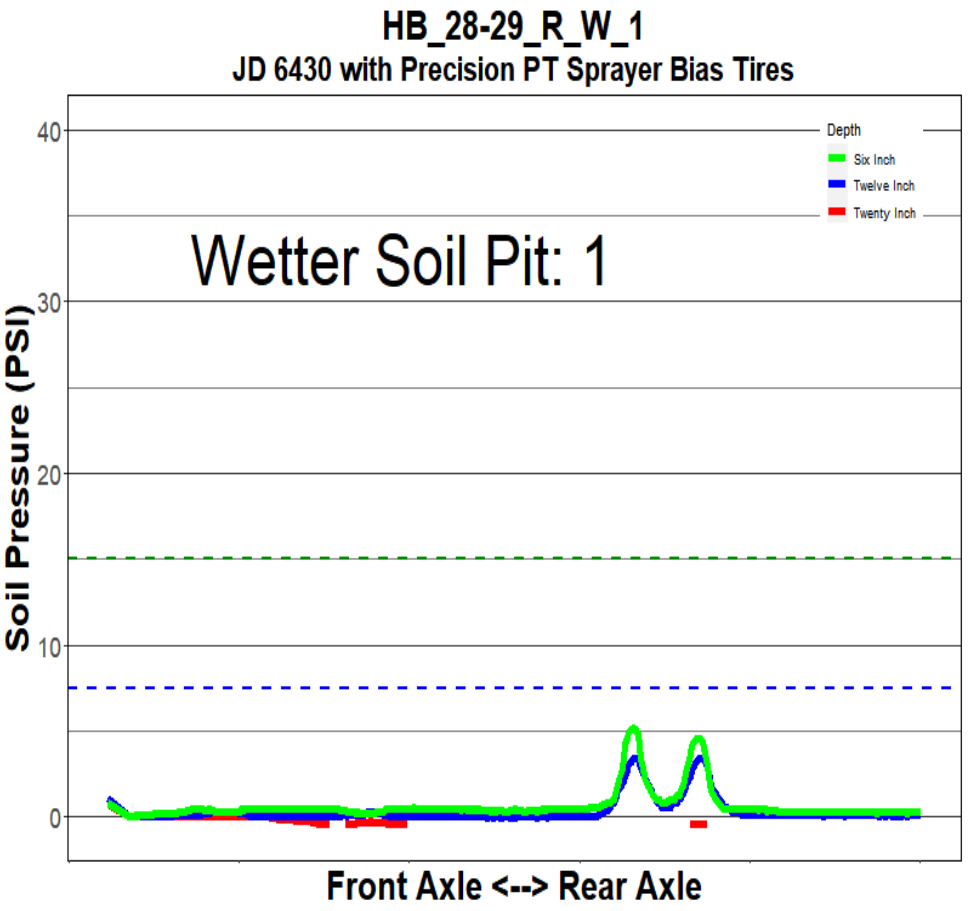
Sprayer - Pulled

Empty or Loaded?

Boom Road or Field?

CTIS: Yes / No?


HB_28-29_R_D_1
JD 6430 with Precision PT Sprayer Bias Tires
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_28-29_R_W_1
JD 6430 with Precision PT Sprayer Bias Tires
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB28+ HB29

- This machine was not really that heavy compared to most.
- 11L tires are not well suited for much more than 2500 lbs per tire.


PRECISION

2022 Hamilton-Brant SCIA Compaction Event

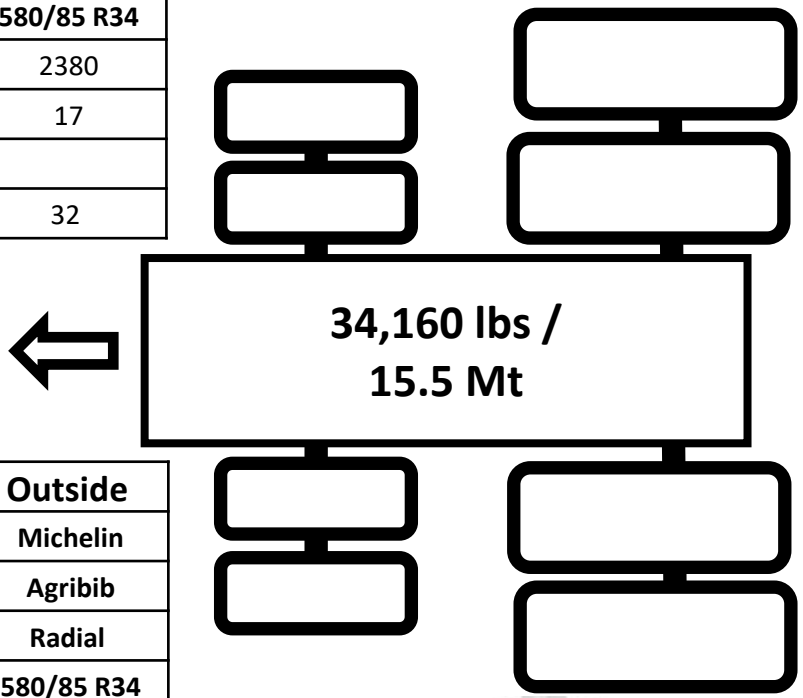
Exhibit: HB30 + HB31 John Deere JD 8245R RC Tractor + Krone 890 Tandem Large Square Baler w Bias Tires


JOHN DEERE
8245 R
KRONE
BiGPAC

Exh#:	HB30	ExhNote:	+HB31		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:		Phone#:	
EquipType:	Row Crop Tractor		Make: John Deere	Model:	8245R

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Agribib	Agribib
Tire Type:	Radial	Radial
Tire Size:	480/85 R34	580/85 R34
TireWt (lbs):	4400	2380
Road PSI:	17	17
Field PSI:		
OnArrival PSI	12.5	32

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Agribib	Agribib
Tire Type:	Radial	Radial
Tire Size:	480/80 R46	480/80 R46
TireWt (lbs):	3780	6300
Road PSI:	17	17
Field PSI:		
OnArrival PSI	21	22



INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Agribib	Agribib
Tire Type:	Radial	Radial
Tire Size:	480/85 R34	580/85 R34
TireWt (lbs):	3930	2700
Road PSI:	17	17
Field PSI:		
OnArrival PSI	24.4	31

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Agribib	Agribib
Tire Type:	Radial	Radial
Tire Size:	480/80 R46	480/80 R46
TireWt (lbs):	5120	5500
Road PSI:	17	17
Field PSI:		
OnArrival PSI	13.6	24.4

Row Crop Tractor - Wheeled

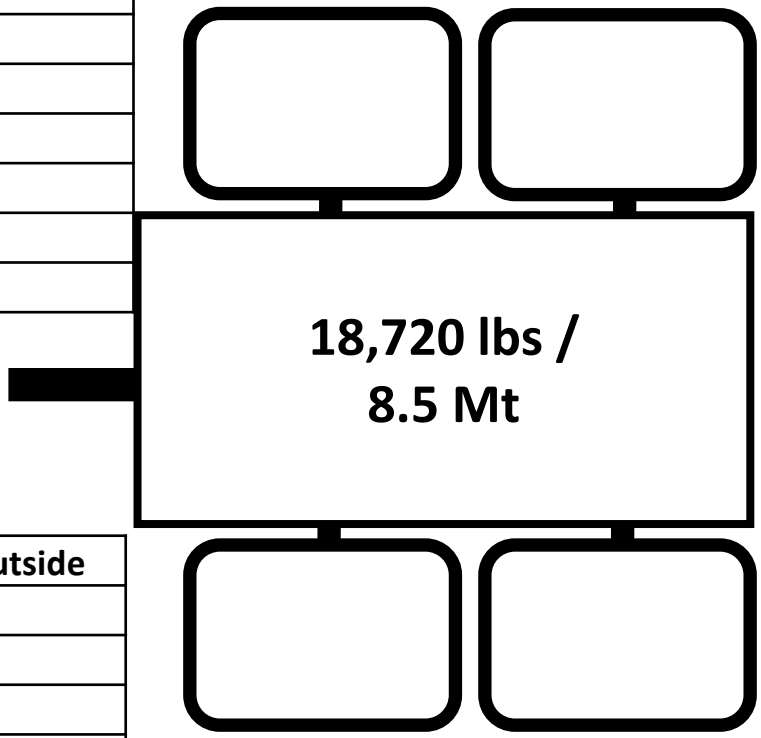
CTIS: Yes / No?


BIGPACK

Exh#:	HB31	ExhNote:	+HB30		AB-diff psi, LR-diff tires, W1W2-diff wts	
ExhName:		OwnerName:			Phone#:	
EquipType:	Baler		Make:	Krone	Model:	890

INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Floatation 648	
Tire Type:	Bias	
Tire Size:	530/45-22.5	
TireWt (lbs):	4700	
Road PSI:		
Field PSI:		
OnArrival PSI	25	

INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Floatation 648	
Tire Type:	Bias	
Tire Size:	530/45-22.5	
TireWt (lbs):	4480	
Road PSI:		
Field PSI:		
OnArrival PSI	26	



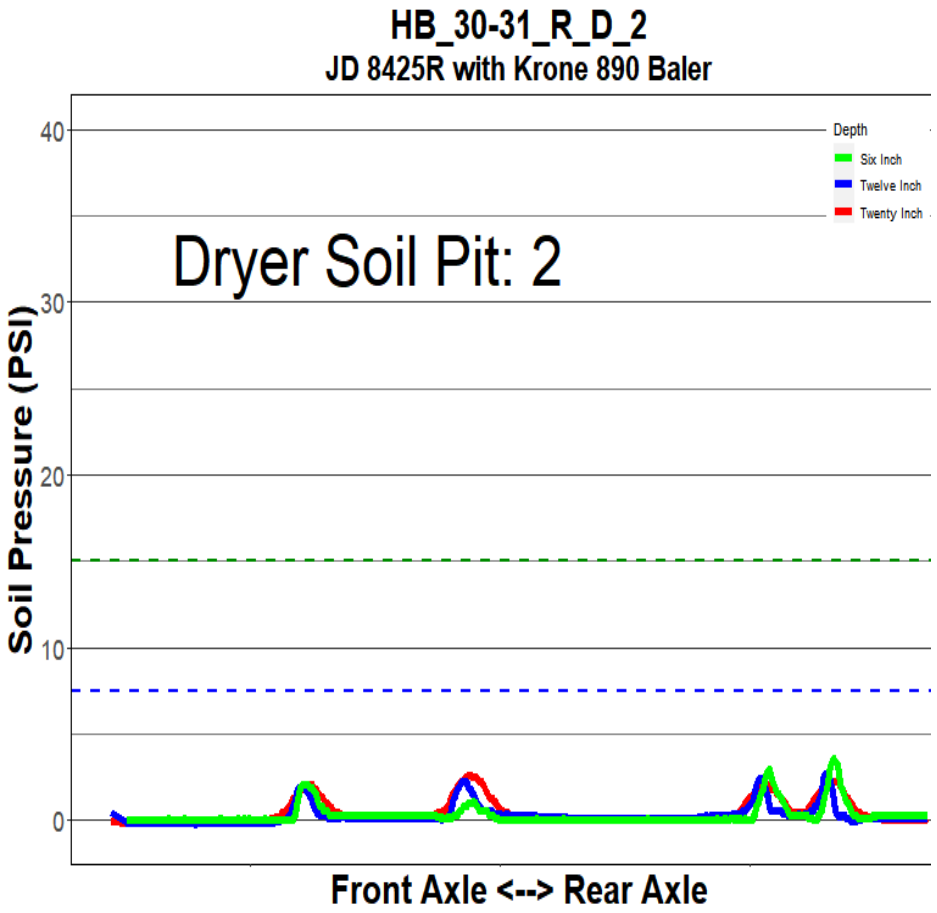
INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Floatation 648	
Tire Type:	Bias	
Tire Size:	530/45-22.5	
TireWt (lbs):	4560	
Road PSI:		
Field PSI:		
OnArrival PSI	24.3	

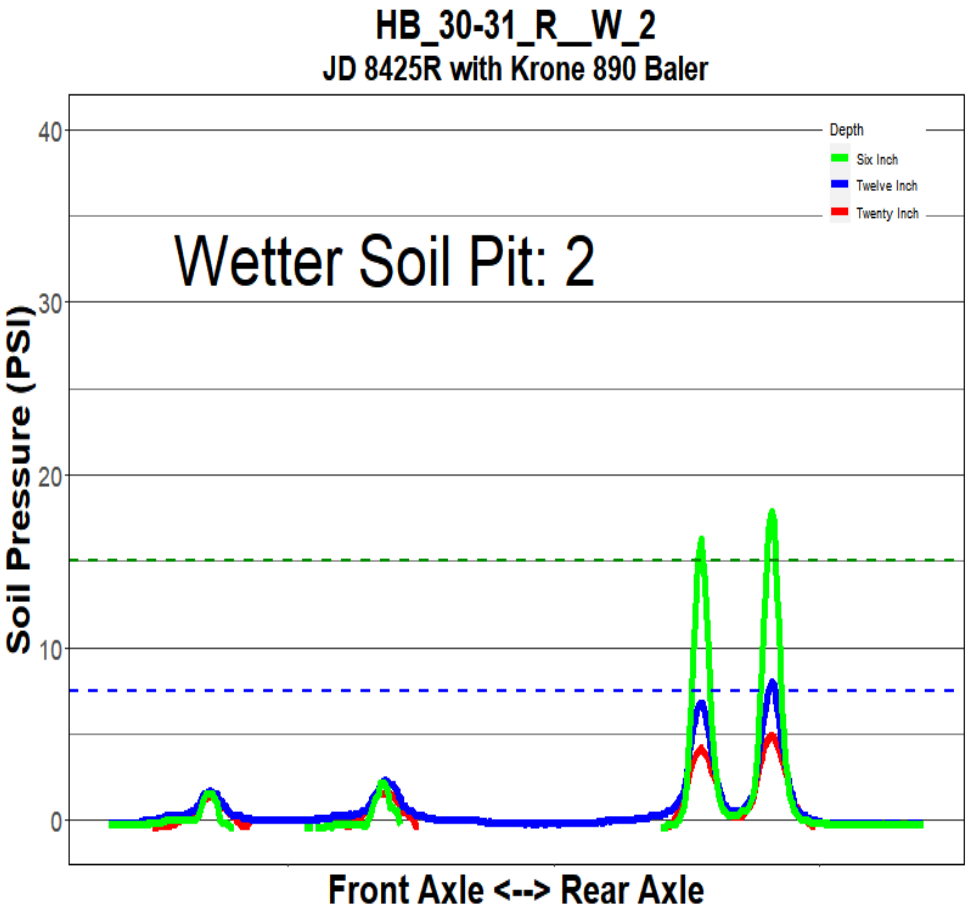
INFO	Inside	Outside
Tire/Trk Make:	BKT	
Tire Model:	Floatation 648	
Tire Type:	Bias	
Tire Size:	530/45-22.5	
TireWt (lbs):	4980	
Road PSI:		
Field PSI:		
OnArrival PSI	22	

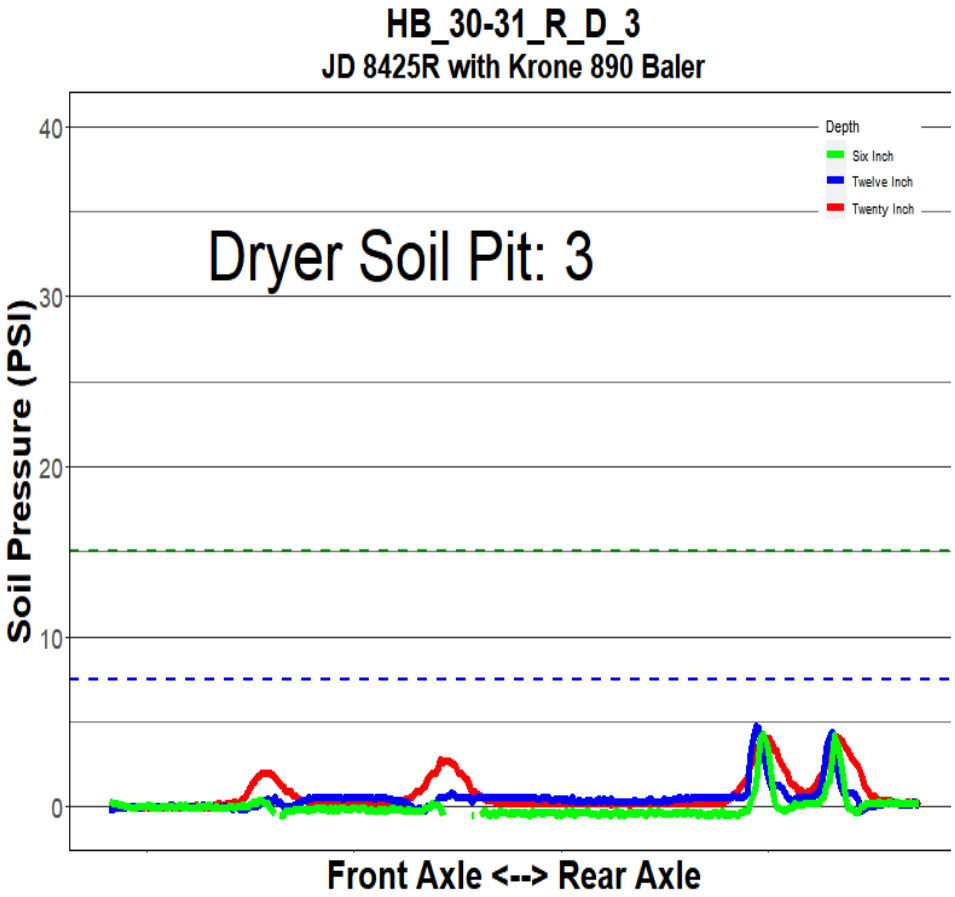
Baler

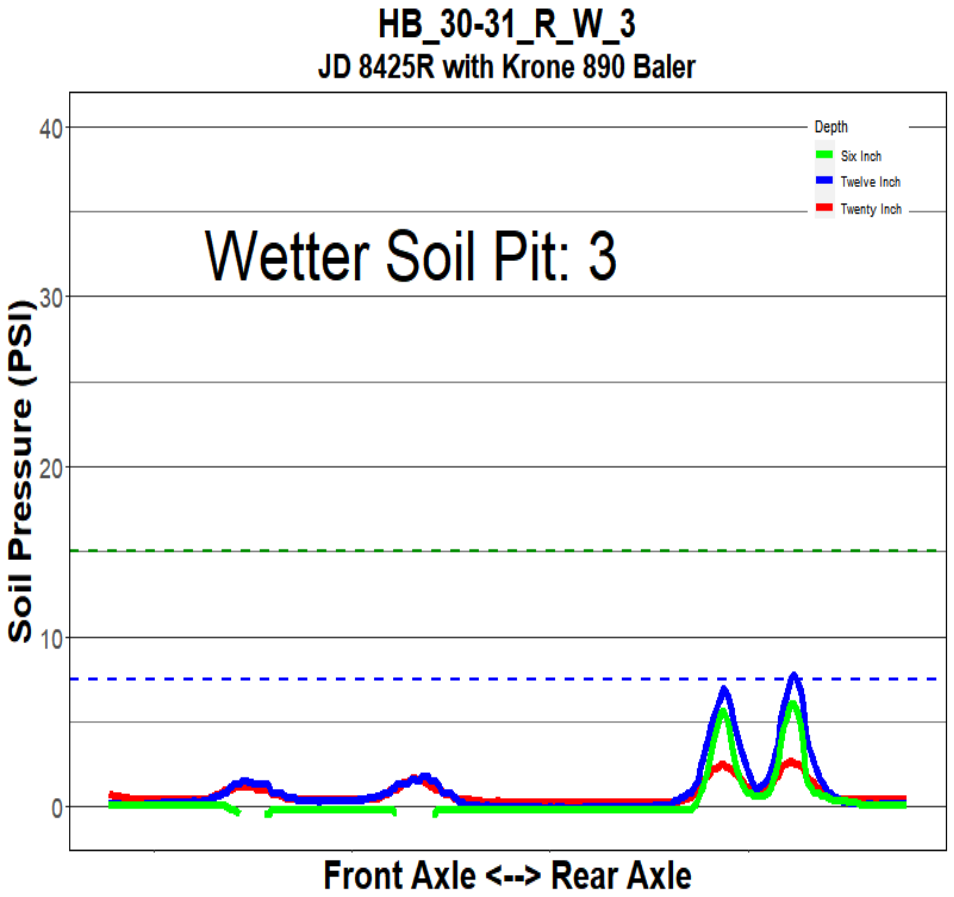
Empty or Loaded?

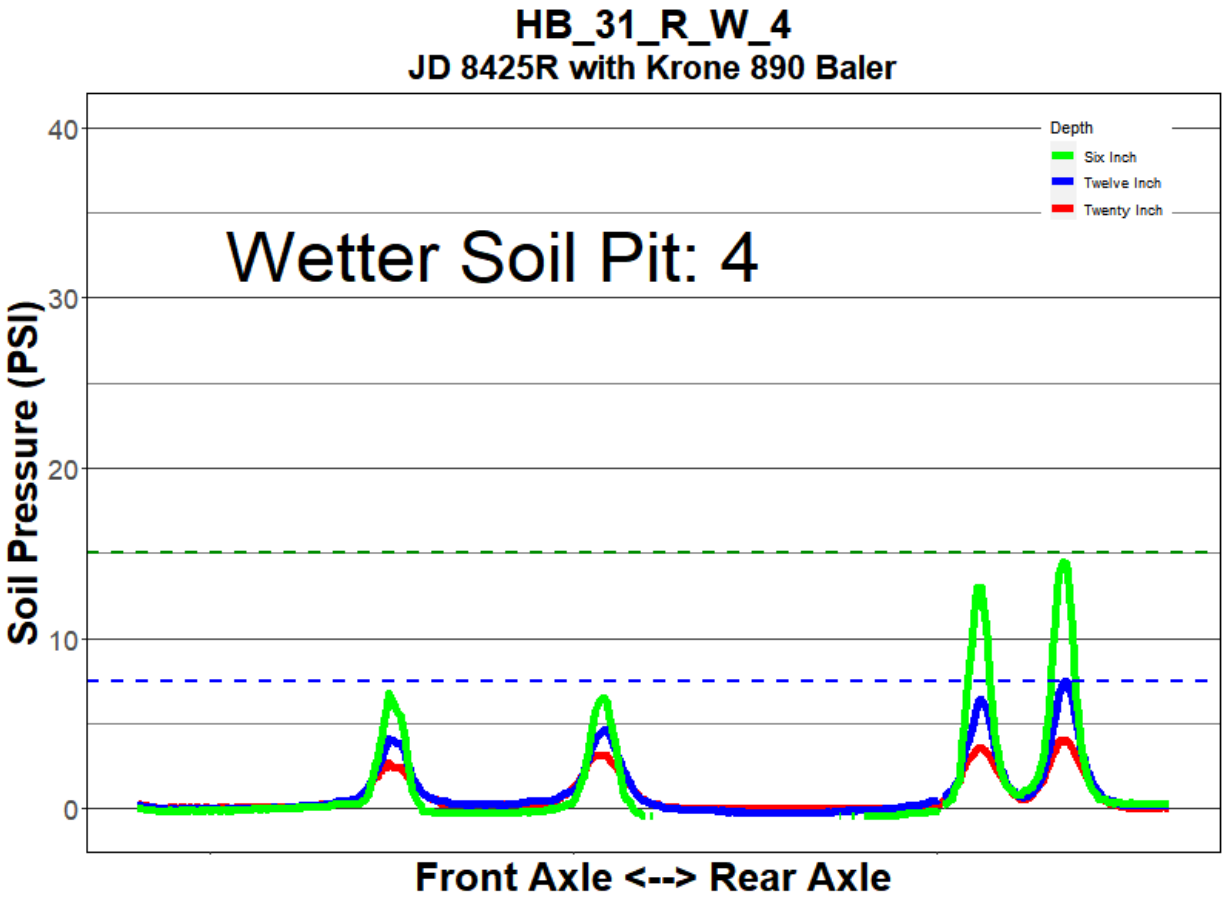
CTIS: Yes / No?


HB_30-31_R_D_2
JD 8425R with Krone 890 Baler
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_30-31_R__W_2
JD 8425R with Krone 890 Baler
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_30-31_R_D_3
JD 8425R with Krone 890 Baler
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_30-31_R_W_3
JD 8425R with Krone 890 Baler
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_31_R_W_4
JD 8425R with Krone 890 Baler
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB30 + HB31

- Soil Response is a bit unexpected for the “Pit3" location.
- Do not underestimate the potential load of hay equipment, especially haylage and high density big square bales.
- The response for pit location 2 in the topsoil was significant and would likely have detrimental impact on the hay stand beyond compaction.
- Be ware of “marketing” hype! This baler implement tire is marked “Flotation” and despite its large size is still a bias tire which requires considerably higher PSI than a correspondingly sized radial.


KRONE
BiGPack




2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB32 + HB33

Case Optum 300 RC Tractor + Nuhn Magnum 5000 Tandem Manure Spreader with Tire Size and CTIS Differences

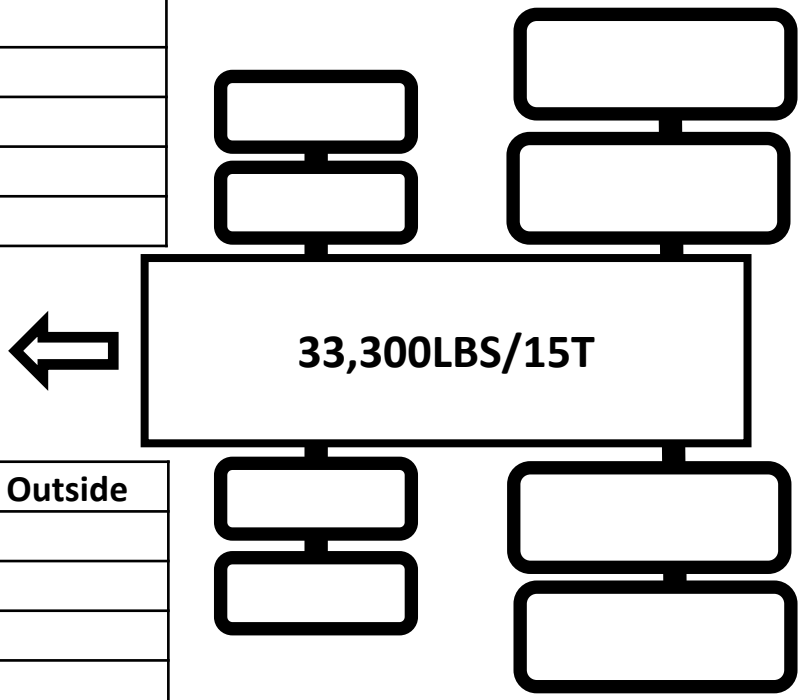

Inflated!


Deflated!

Exh#:	HB32	ExhNote:	HB33	AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:	Agribrink	OwnerName:	Jake Kraayenbrink	Phone#:
EquipType:	RC Tractor	Make:	CaseIH	Model: Optum 300

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	Maxi Traction	
Tire Type:	VF	
Tire Size:	650/60R34	
TireWt (lbs):	4740	
Road PSI:	29	
Field PSI:	9	
OnArrival PSI	NA	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	Michelin
Tire Model:	Agribib	Agribib
Tire Type:	R	R
Tire Size:	480/95R50	480/95R50
TireWt (lbs):	7460	5200
Road PSI:	25(9)	25(9)
Field PSI:	6	6
OnArrival PSI	NA	NA



INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	Maxi Traction	
Tire Type:	RVF	
Tire Size:	650/60R34	
TireWt (lbs):	5300	
Road PSI:	29	
Field PSI:	9	
OnArrival PSI	NA	

INFO	Inside	Outside
Tire/Trk Make:	Firestone	
Tire Model:	Maxi Traction	
Tire Type:	VF	
Tire Size:	900/60R42	
TireWt (lbs):	10600	
Road PSI:	29	
Field PSI:	9	
OnArrival PSI	NA	

Row Crop Tractor - Wheeled

CTIS: Yes / No?


Inflated!


Inflated!

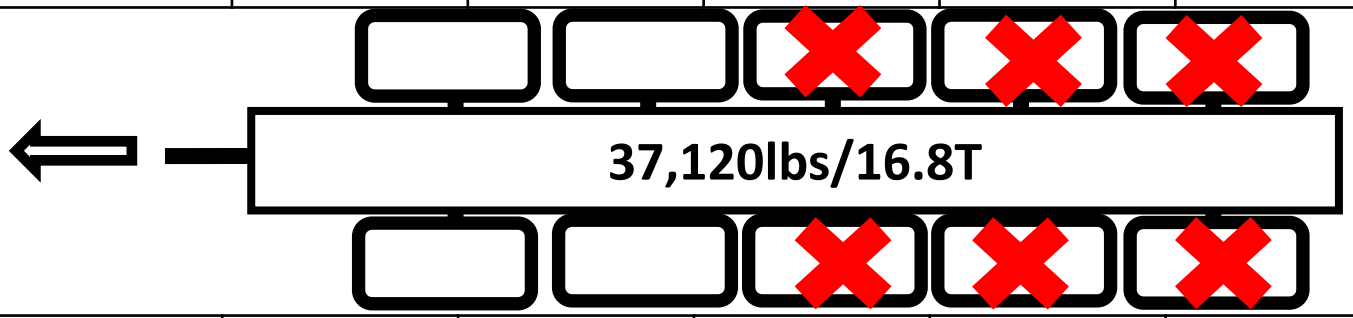

Deflated!


Deflated!

Exh#:	HB33	ExhNote:	+HB32		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:	Agribrink	OwnerName:	Jake Kraayenbrink	Phone#:	
EquipType:	Liquid Manure Spreader	Make:	Nuhn	Model:	Magnum 5000

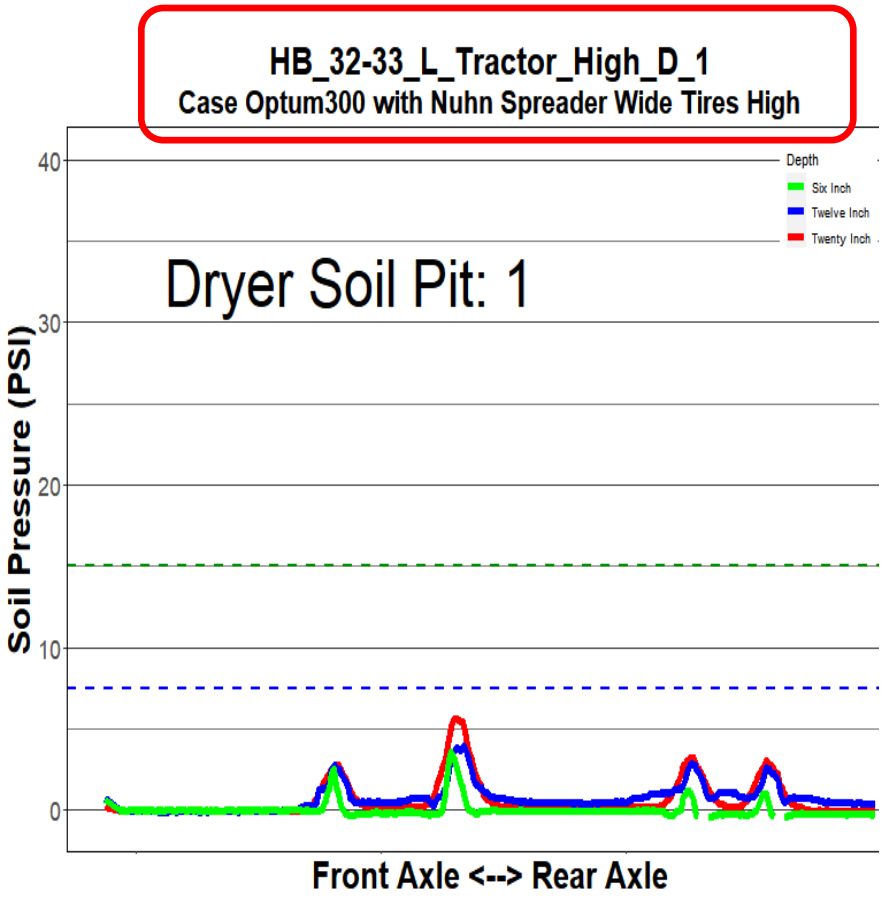
INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Goodyear					
Tire Model:	All Weather Radial II					
Tire Type:	Radial	Radial				
Tire Size:	480/80R38 (18.4R38)					
TireWt (lbs):	12,200	11,120				
Road PSI:	55					
Field PSI:	26					
OnArrival PSI	NA	NA				

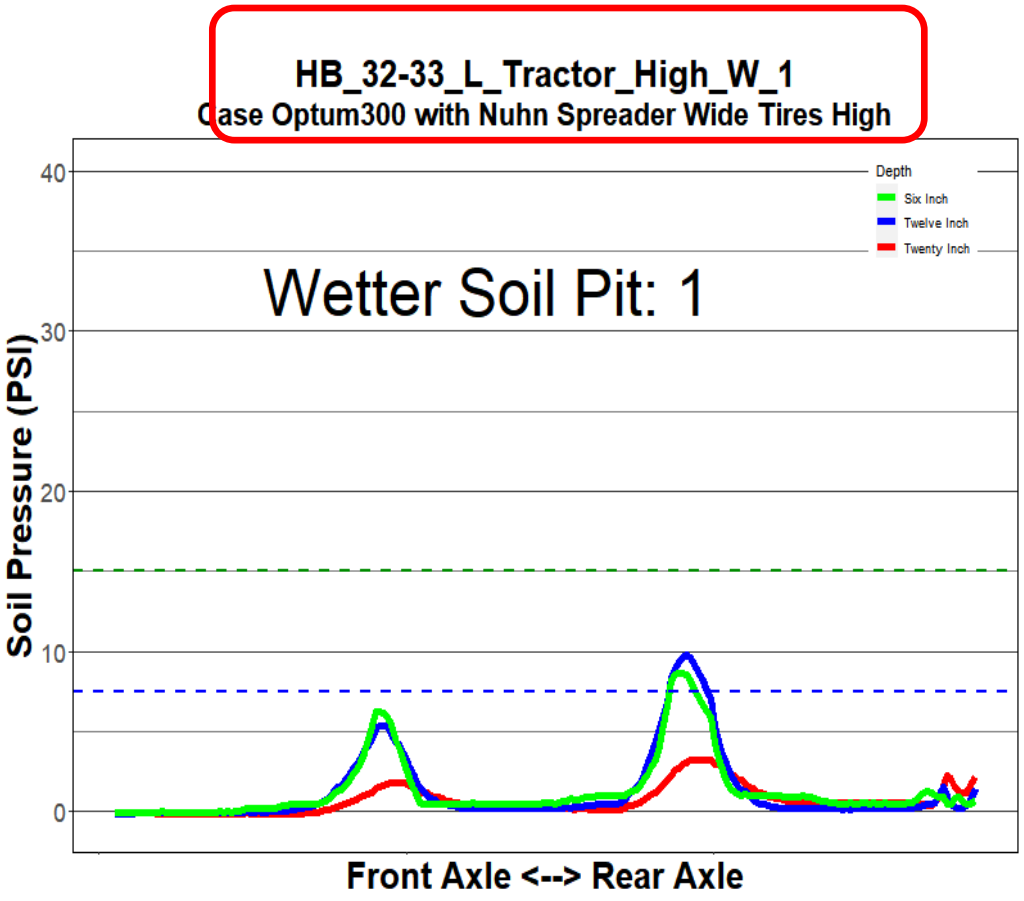
Large Wagon/ Trailer/ Tanks / Etc



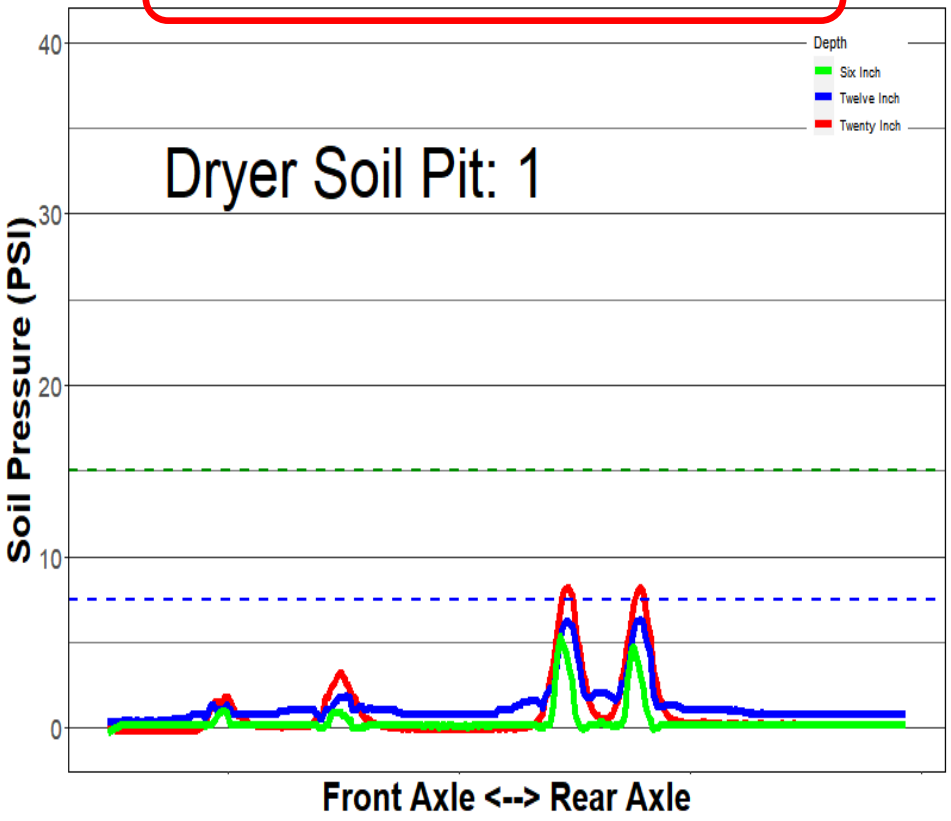
INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Alliance					
Tire Model:	Agri Transport					
Tire Type:	Radial	Radial				
Tire Size:	800/65R32 (30.5LR32)					
TireWt (lbs):	12,700	12,100				
Road PSI:	35					
Field PSI:	12					
OnArrival PSI	NA	NA				

CTIS: Yes / No

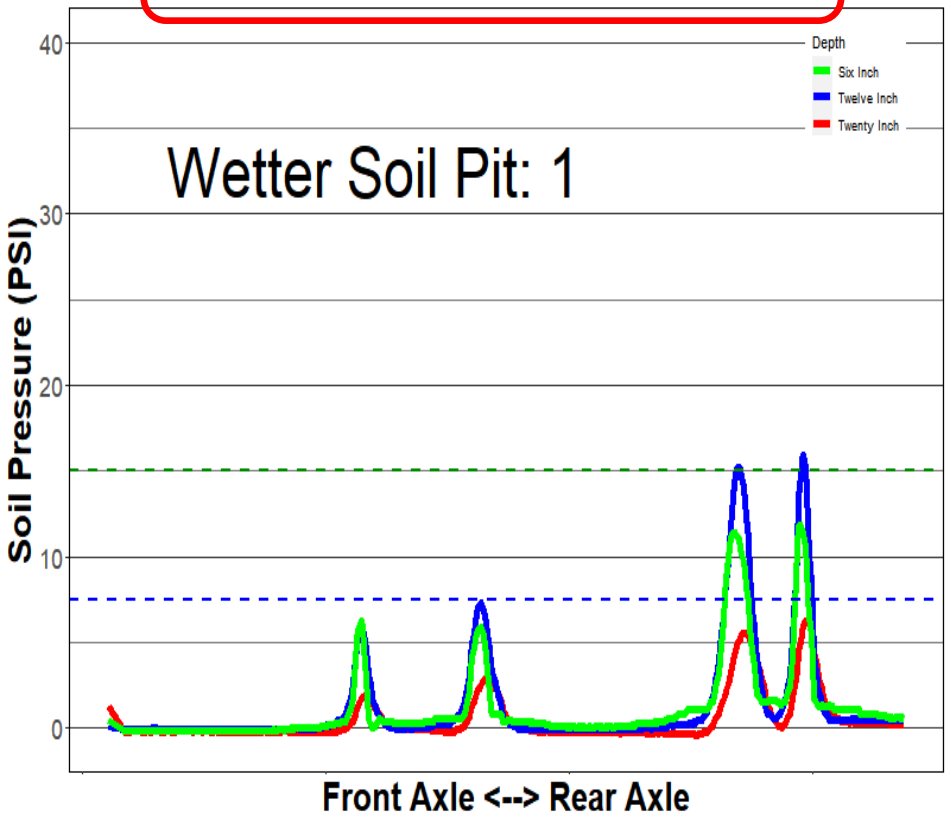

HB_32-33_L_Tractor_High_D_1
Case Optum300 with Nuhn Spreader Wide Tires High
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

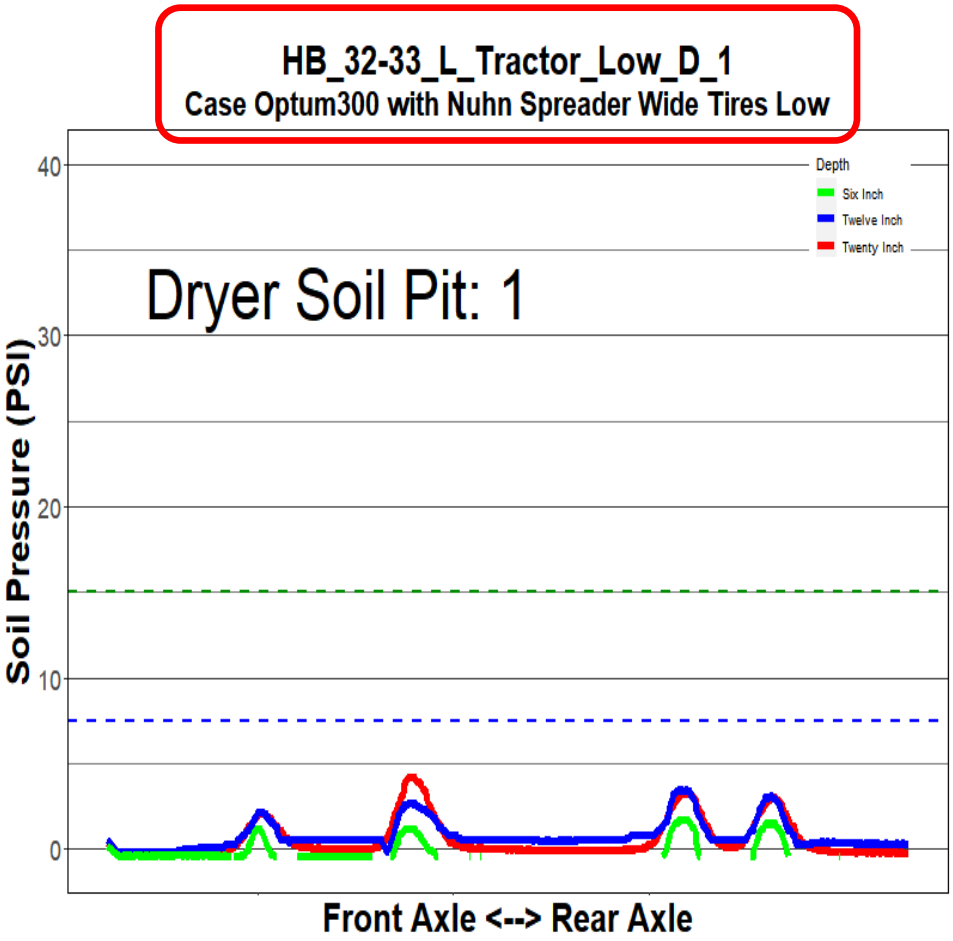

HB_32-33_L_Tractor_High_W_1
Case Optum300 with Nuhn Spreader Wide Tires High
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

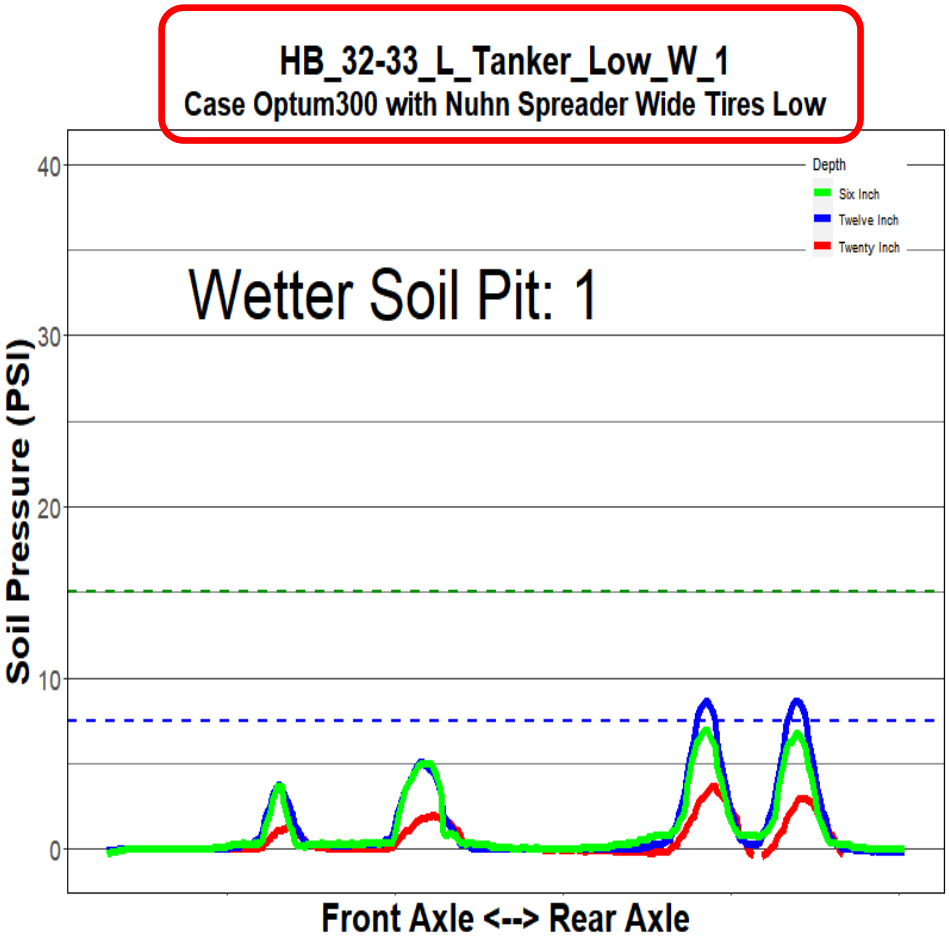
HB_32-33_L_Tank_High_D_1
Case Optum300 with Nuhn Spreader Wide Tires High

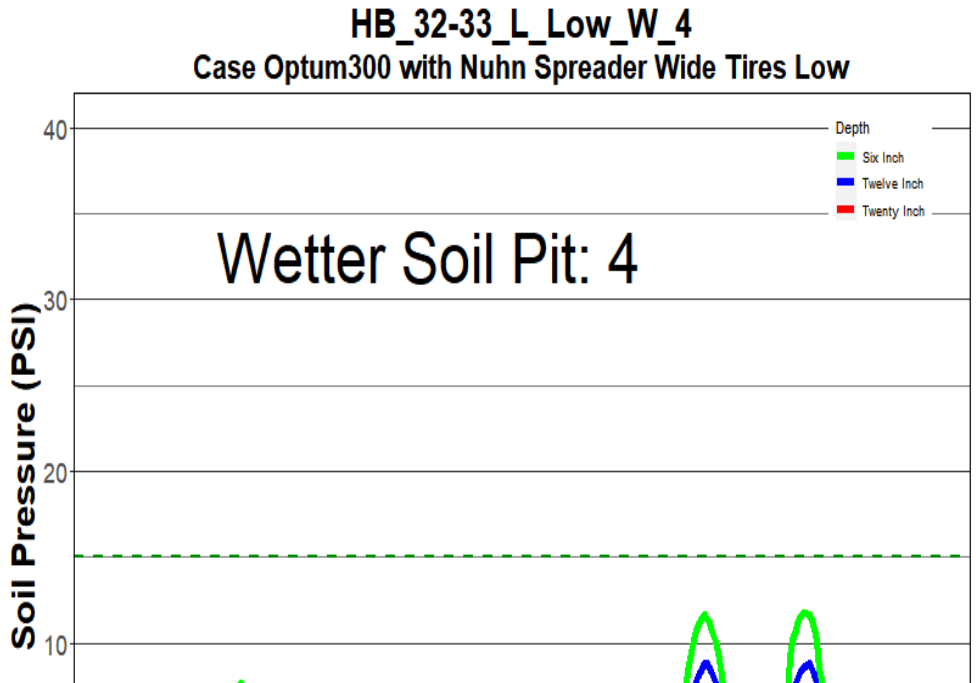


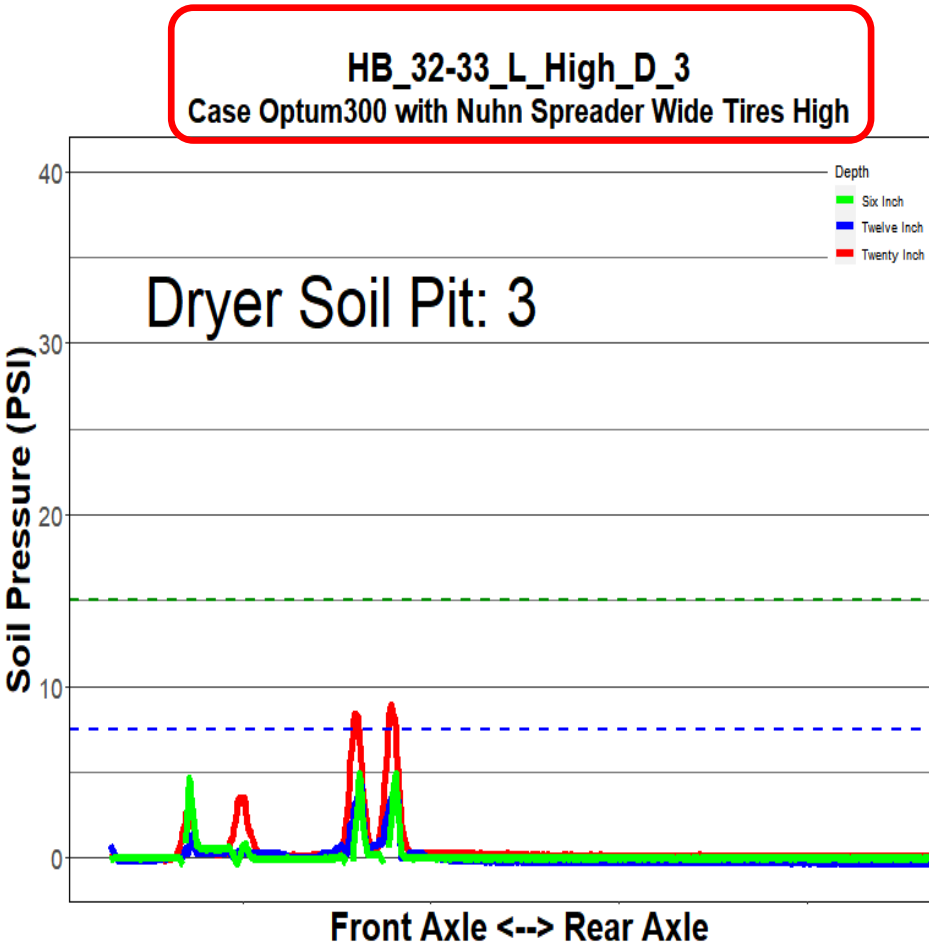
HB_32-33_L_Tanker_High_W_1
Case Optum300 with Nuhn Spreader Wide Tires High

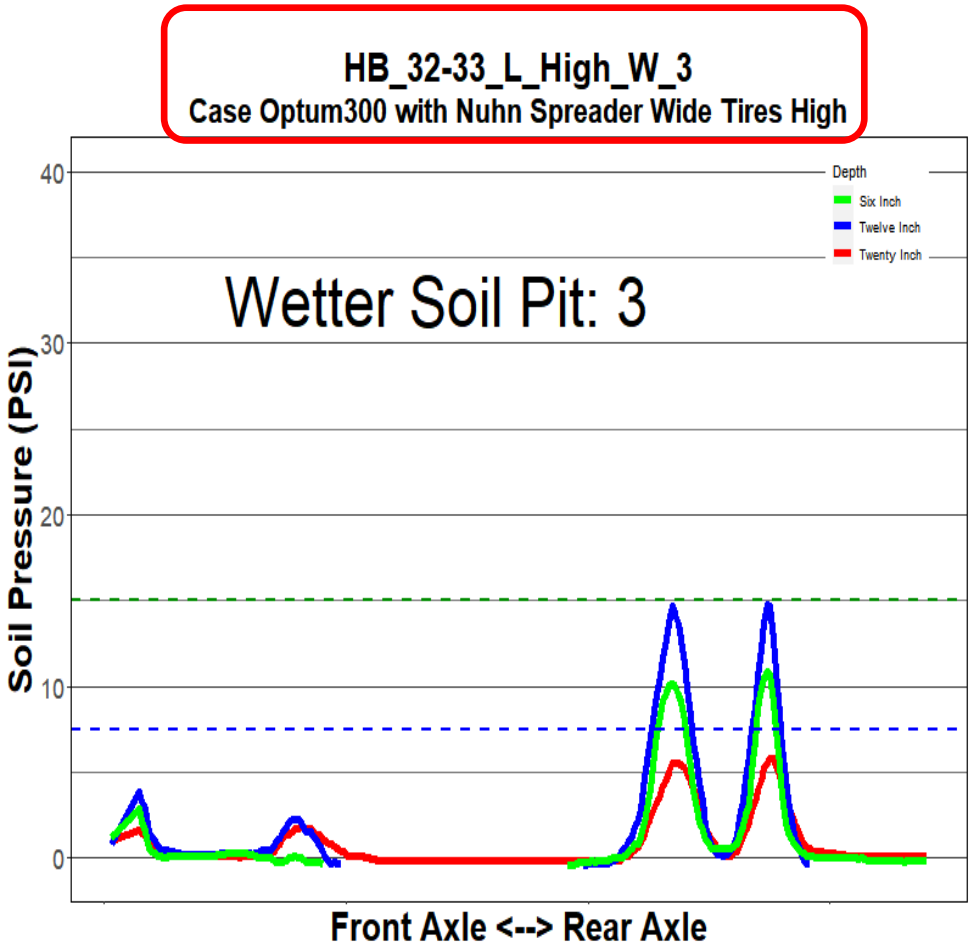


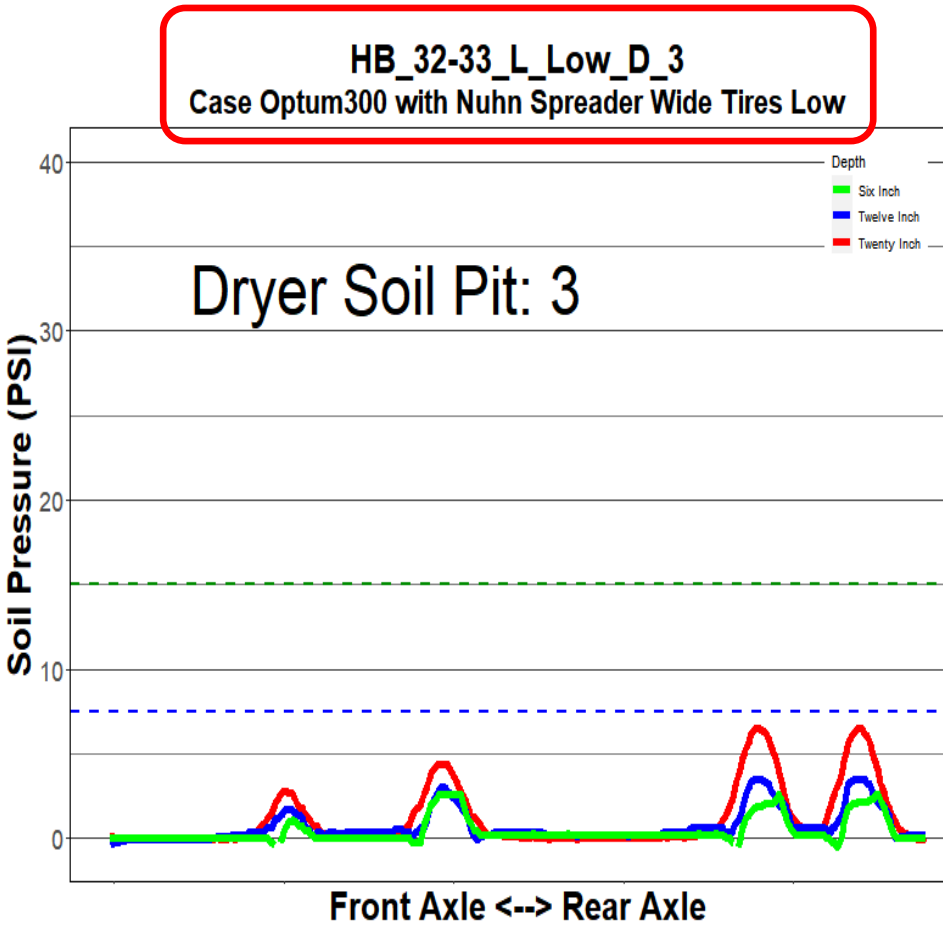

HB_32-33_L_Tractor_Low_D_1
Case Optum300 with Nuhn Spreader Wide Tires Low
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

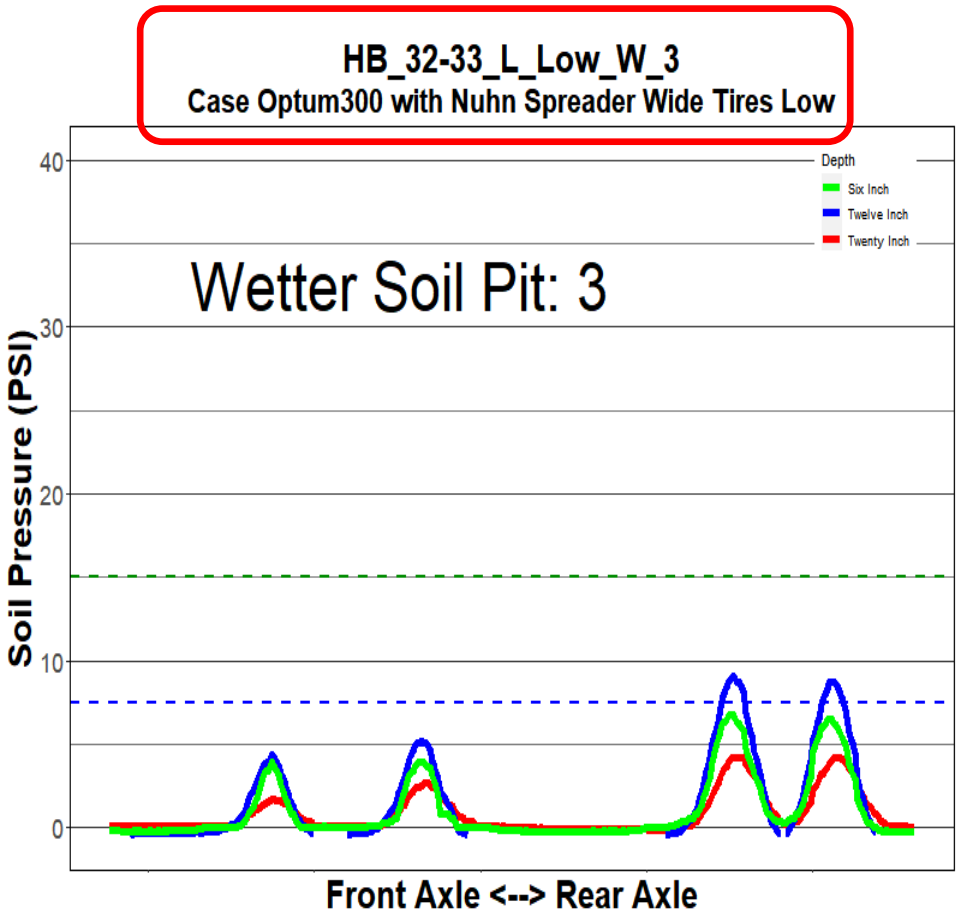

HB_32-33_L_Tanker_Low_W_1
Case Optum300 with Nuhn Spreader Wide Tires Low
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

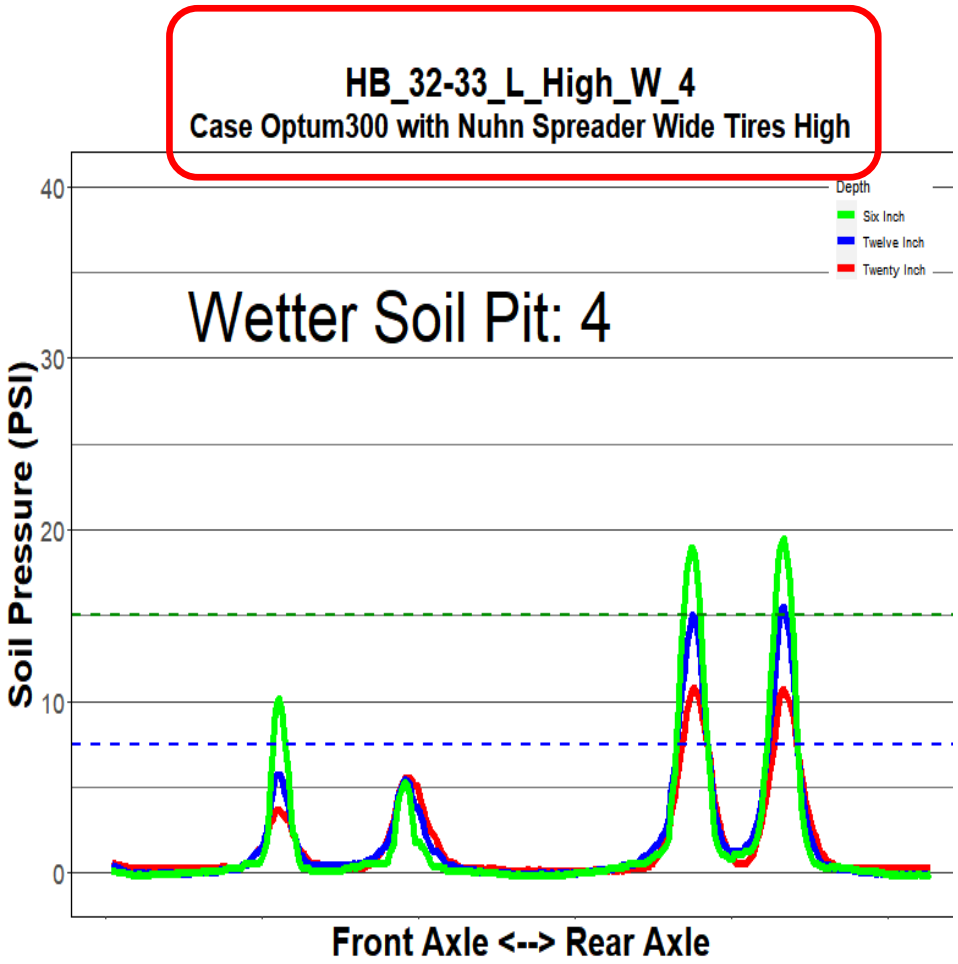

HB_32-33_L_Low_W_4
Case Optum300 with Nuhn Spreader Wide Tires Low
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 4
Soil Pressure (PSI)
40
30
20
10

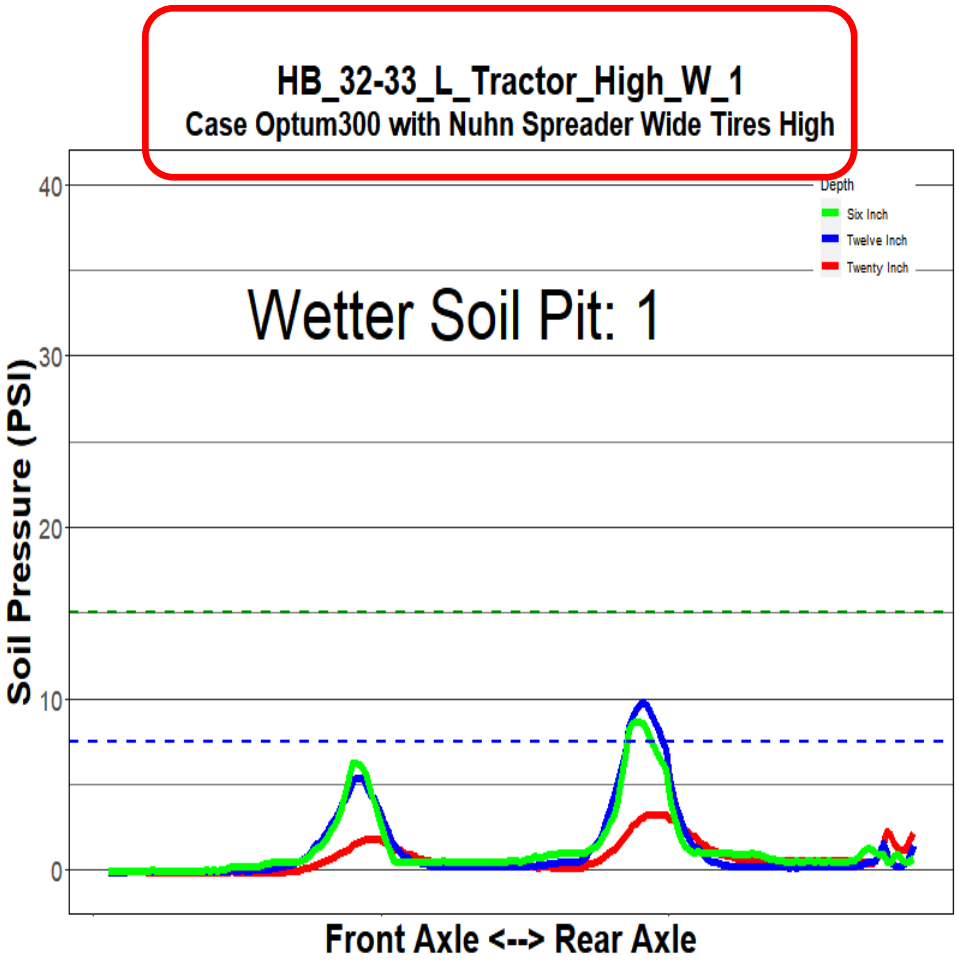

HB_32-33_L_High_D_3
Case Optum300 with Nuhn Spreader Wide Tires High
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

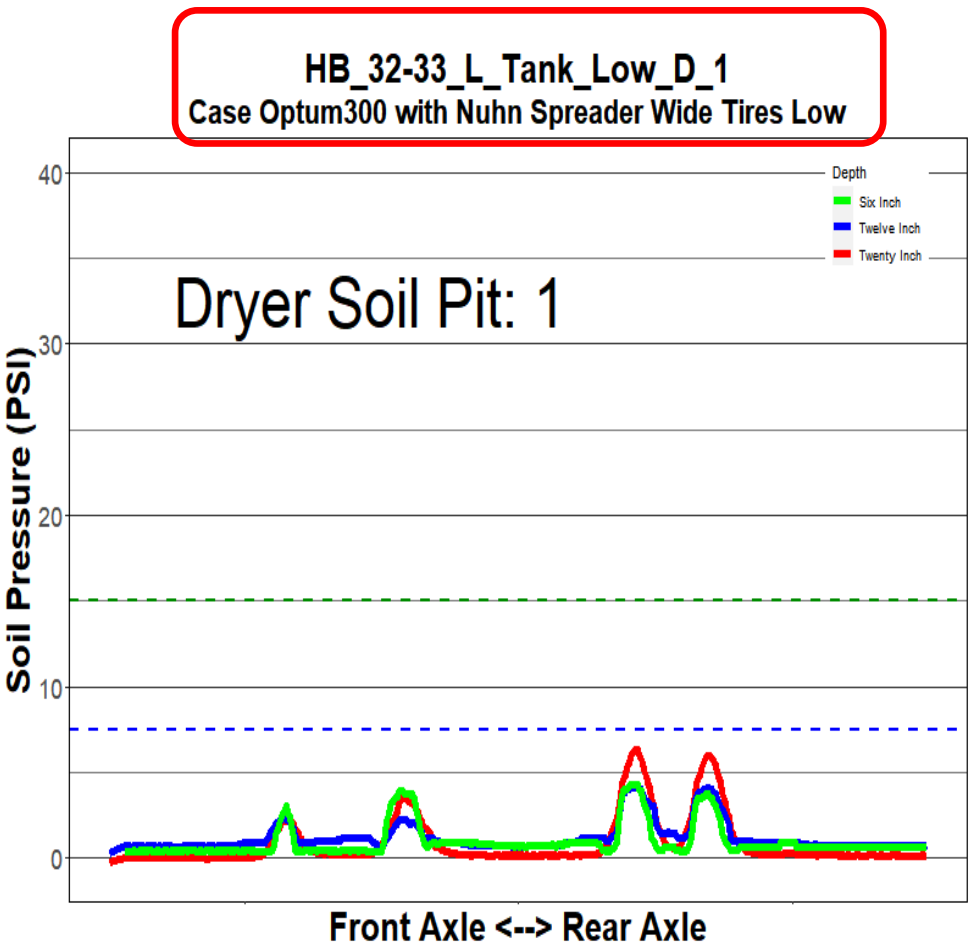

HB_32-33_L_High_W_3
Case Optum300 with Nuhn Spreader Wide Tires High
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

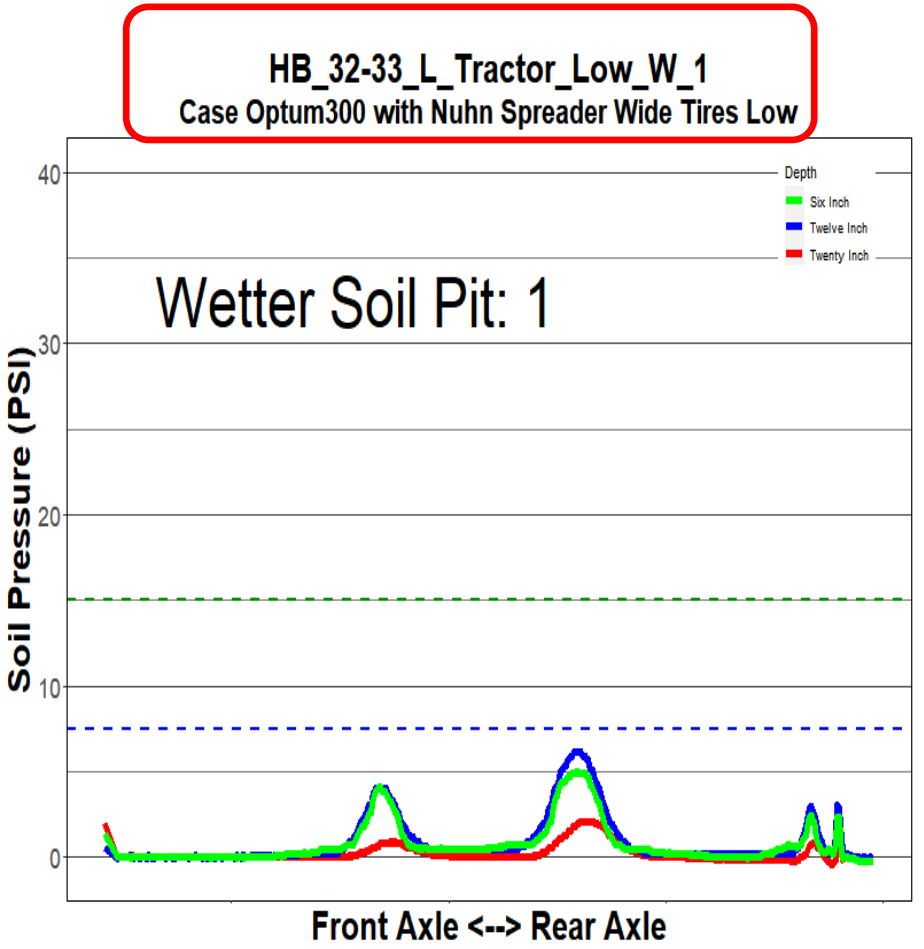

HB_32-33_L_Low_D_3
Case Optum300 with Nuhn Spreader Wide Tires Low
Dryer Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_32-33_L_Low_W_3
Case Optum300 with Nuhn Spreader Wide Tires Low
Wetter Soil Pit: 3
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

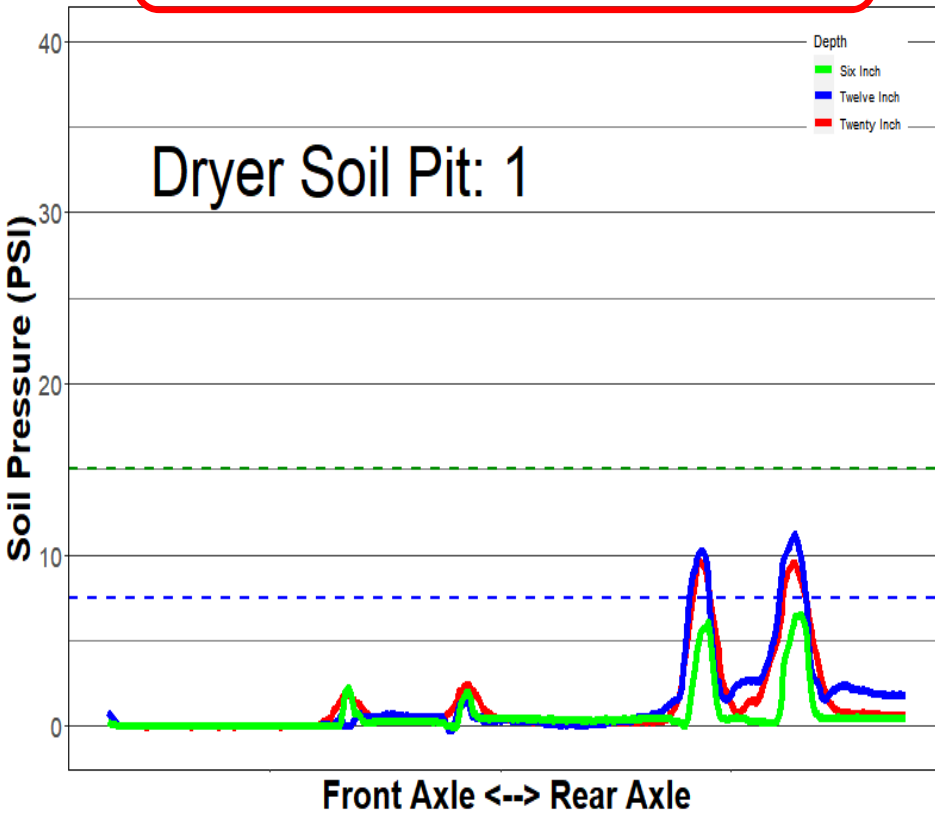

HB_32-33_L_High_W_4
Case Optum300 with Nuhn Spreader Wide Tires High
Wetter Soil Pit: 4
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_32-33_L_Tractor_High_W_1
Case Optum300 with Nuhn Spreader Wide Tires High
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

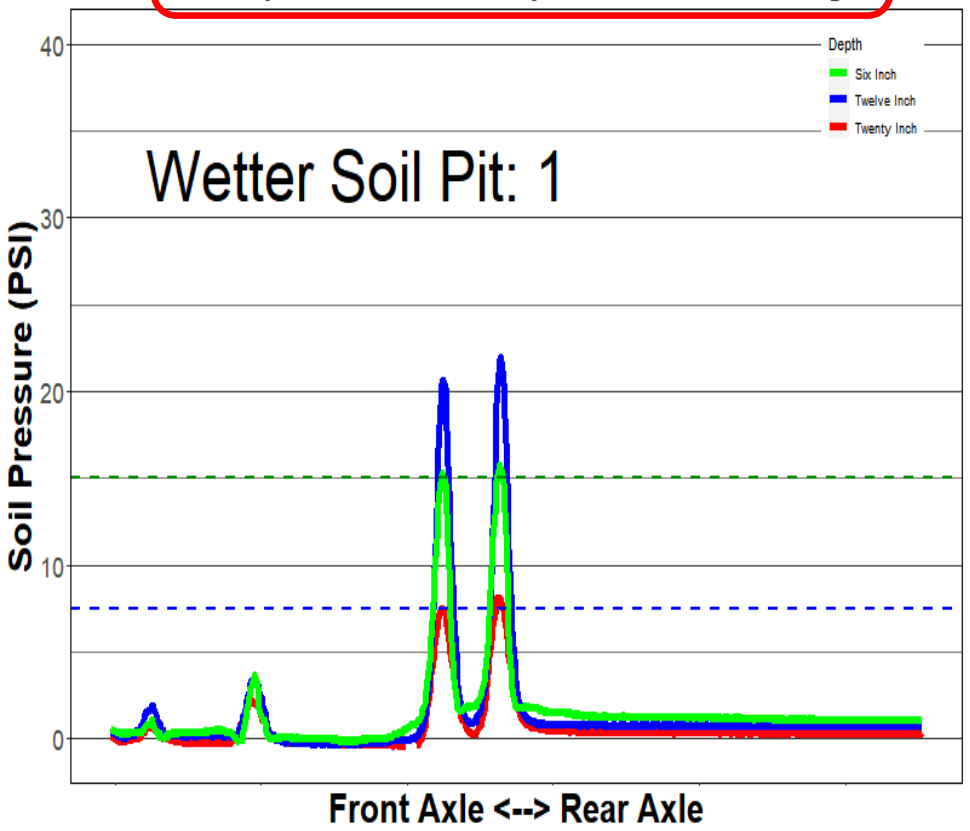

HB_32-33_L_Tank_Low_D_1
Case Optum300 with Nuhn Spreader Wide Tires Low
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

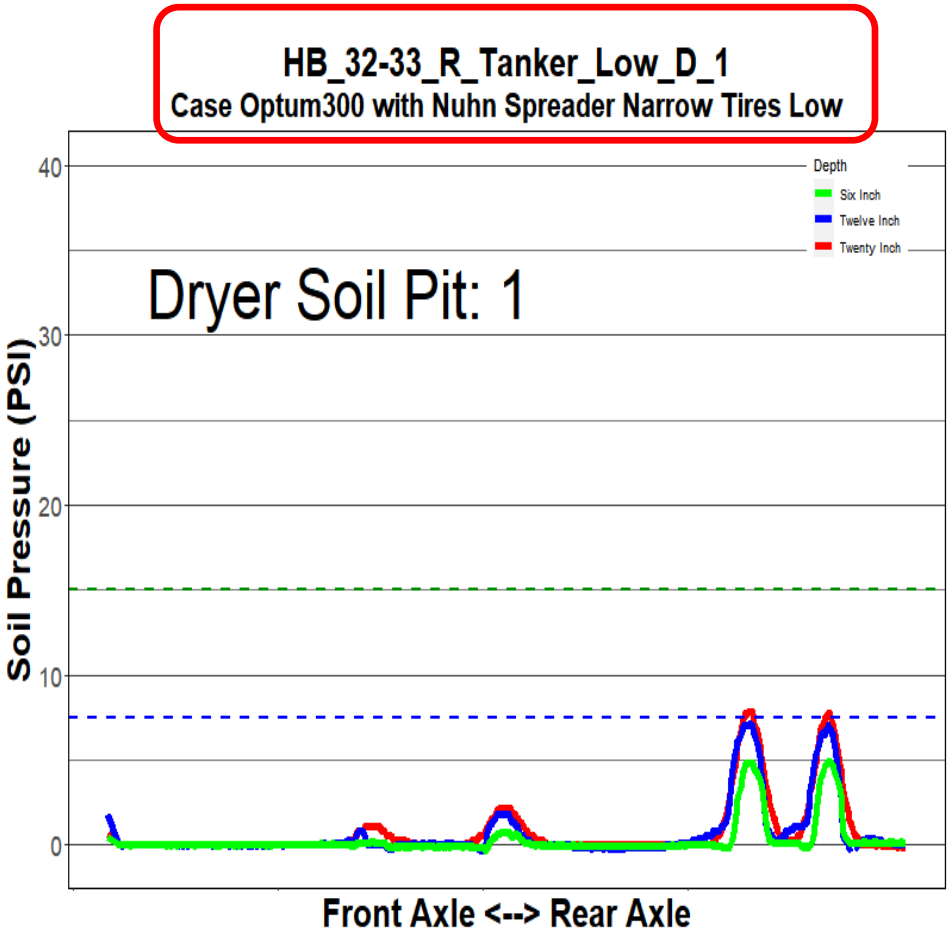

HB_32-33_L_Tractor_Low_W_1
Case Optum300 with Nuhn Spreader Wide Tires Low
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

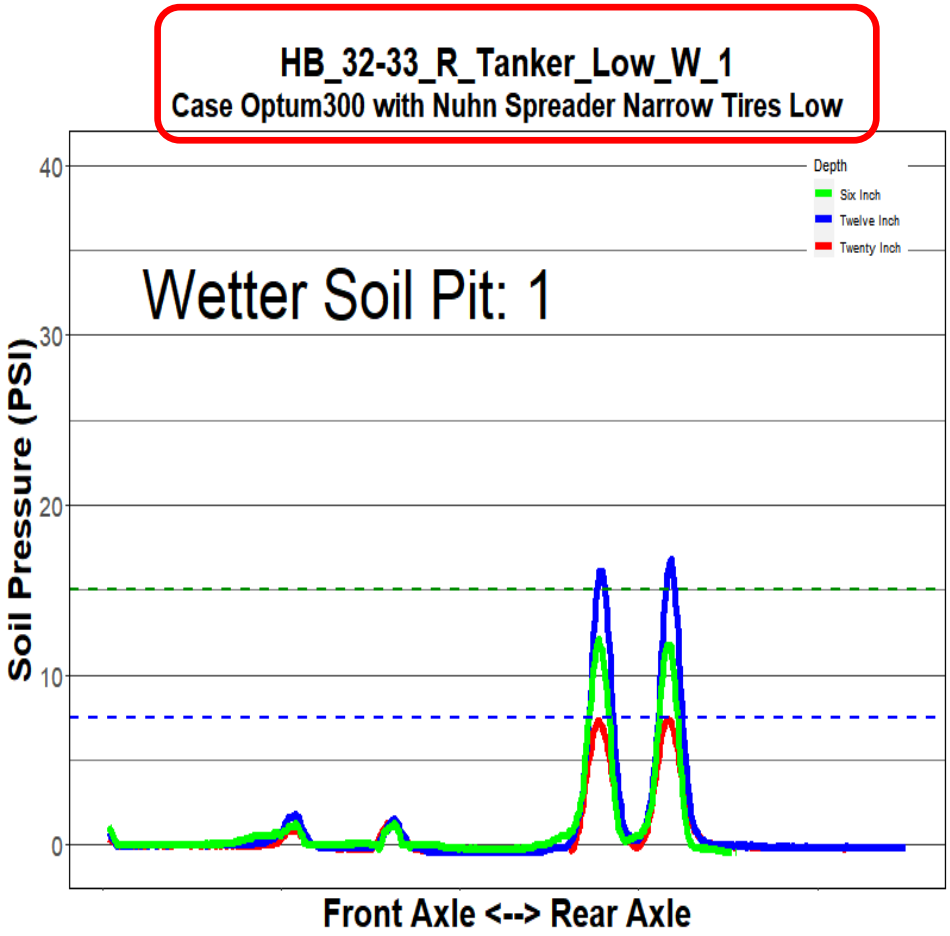
HB_32-33_R_Tanker_High_D_1
Case Optum300 with Nuhn Spreader Narrow Tires High



HB_32-33_R_Tanker_High_W_1
Case Optum300 with Nuhn Spreader Narrow Tires High




HB_32-33_R_Tanker_Low_D_1
Case Optum300 with Nuhn Spreader Narrow Tires Low
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_32-33_R_Tanker_Low_W_1
Case Optum300 with Nuhn Spreader Narrow Tires Low
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB32 + HB33

- The soil response for this machine was unexpected with 12 inch stress exceeding 6 inch stress at times.
- When the sensors were deinstalled we found a very wide spread compacted layer in the first 8” of soil which might have been transferring weight directly deeper than would normally be expected, ie shallow soil too dense to pick up the stress load, just pass it deeper.
- There is a lot to consider here in terms of soil moisture, tire size, tire PSI. Please review carefully to ascertain all the learnings.
- Typically, dryer soil, lighter load weights, with more (tandem, duals, etc), larger and better tires (VF>IF>Radial>>>Bias) and lower PSI reduce the threat of compaction.

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB35 + HB36

Case Magnum 310 RC Tractor + John Deere JD1770NT Central Fill Planter with CTIS


CASE
310
MAGNUM

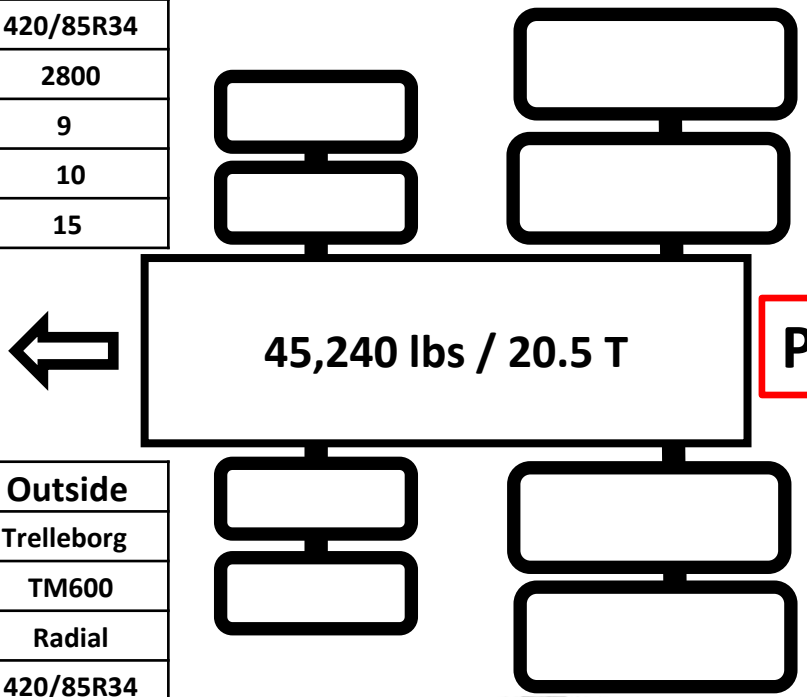

JOHN DEERE
CCS Seed Delivery


HB36
CASE

Exh#:	HB35	ExhNote:	+HB36		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Koepfer	Phone#:	
EquipType:	RC Tractor		Make:	Case	Model:	310 Magnum

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	420/85R34	420/85R34
TireWt (lbs):	2900	2800
Road PSI:	9	9
Field PSI:	10	10
OnArrival PSI	15	15

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	480/80R50	480/80R50
TireWt (lbs):	9400	7680
Road PSI:	35	35
Field PSI:	10	10
OnArrival PSI	CTIS	CTIS



Planter in field position

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	420/85R34	420/85R34
TireWt (lbs):	2780	3040
Road PSI:	9	9
Field PSI:	10	10
OnArrival PSI	15	15

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	480/80R50	480/80R50
TireWt (lbs):	8600	8040
Road PSI:	35	35
Field PSI:	10	10
OnArrival PSI	CTIS	CTIS

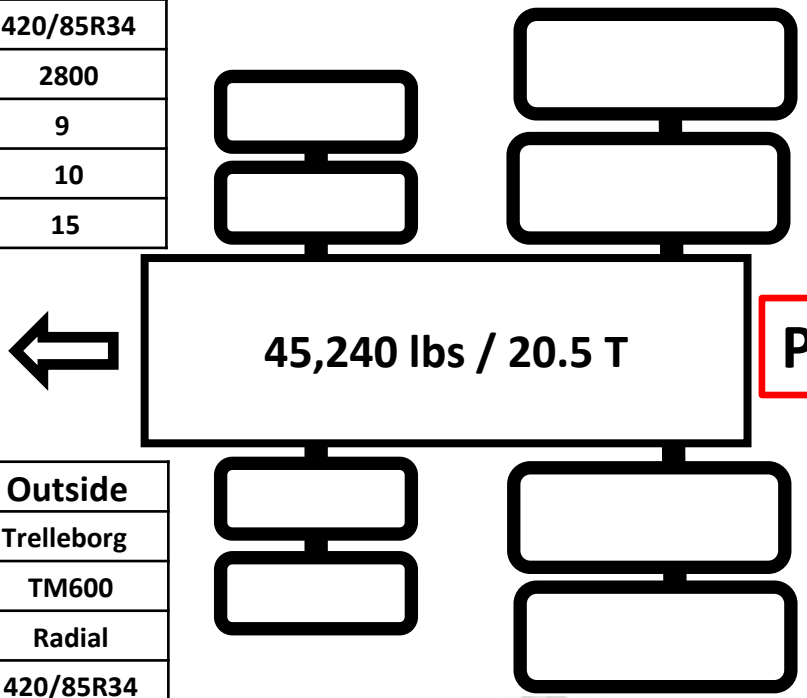
Row Crop Tractor - Wheeled

CTIS: Yes / No?

Exh#:	HB35	ExhNote:	+HB36		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Koepfer	Phone#:	
EquipType:	RC Tractor		Make: Case	Model:	310 Magnum

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	420/85R34	420/85R34
TireWt (lbs):	2300	2800
Road PSI:	9	9
Field PSI:	10	10
OnArrival PSI	15	15

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	480/80R50	480/80R50
TireWt (lbs):	10260	9240
Road PSI:	35	35
Field PSI:	10	10
OnArrival PSI	CTIS	CTIS



Planter in road position

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	420/85R34	420/85R34
TireWt (lbs):	2780	2740
Road PSI:	9	9
Field PSI:	10	10
OnArrival PSI	15	15

INFO	Inside	Outside
Tire/Trk Make:	Trelleborg	Trelleborg
Tire Model:	TM600	TM600
Tire Type:	Radial	Radial
Tire Size:	480/80R50	480/80R50
TireWt (lbs):	9600	9660
Road PSI:	35	35
Field PSI:	10	10
OnArrival PSI	CTIS	CTIS

Row Crop Tractor - Wheeled

CTIS: Yes / No?


CASE IH

Exh#:		ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Koepfer	Phone#:
EquipType:	Row Crop Planter	Make:	JD	Model: 1770NT

INFO	Tire 1	Tire 2	Tire 3	Tire 4	Tire 5	Tire 6	Tire 7	Tire 8
Tire/Trk Make:	Firestone							
Tire Model:	Destination Farm							
Tire Type:	VF							
Tire Size:	295/75R22.5							
TireWt (lbs):	2940	1640	5520	5300	4900	4400	3240	1640
Road PSI:								
Field PSI:	23	23	23	23	23	23	23	23
OnArrival PSI	23	23	64	64	64	64	23	23

E = empty and L = loaded

R = road and F = field

Draw Tire Layout and Label Each Tire

29,580 lbs / 13.4 T

Planter in Field Position

- Tires numbered from left to right side
- Partially loaded

Corn Planter

Empty or Loaded?

Road or Field?

CTIS: Yes / No?

Exh#:		ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Koepfer	Phone#:
EquipType:	Row Crop Planter	Make:	JD	Model: 1770NT

INFO	Tire 1	Tire 2	Tire 3	Tire 4	Tire 5	Tire 6	Tire 7	Tire 8
Tire/Trk Make:	Firestone							
Tire Model:	Destination Farm							
Tire Type:	VF							
Tire Size:	295/75R22.5							
TireWt (lbs):			6980	6840	5900	5600		
Road PSI:								
Field PSI:			23	23	23	23		
OnArrival PSI			64	64	64	64		

E = empty and L = loaded

R = road and F = field

Draw Tire Layout and Label Each Tire

25,320 lbs / 11.5 T

Planter in Road Position

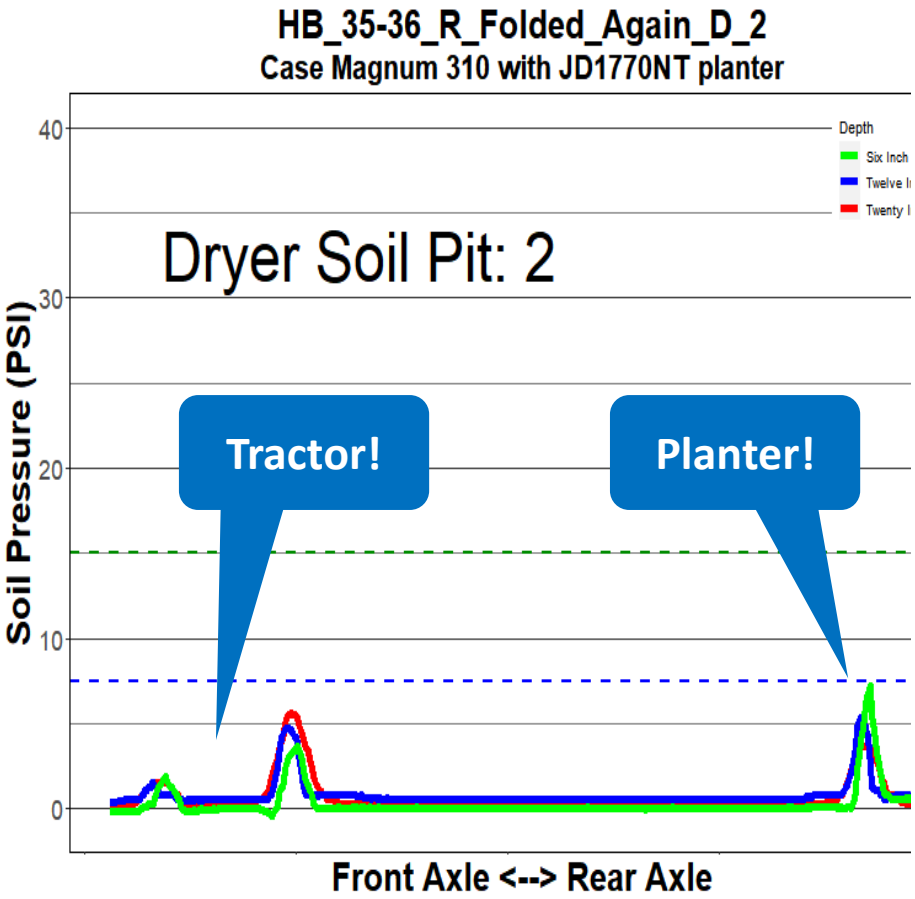
- Tires numbered from left to right side
- Partially loaded

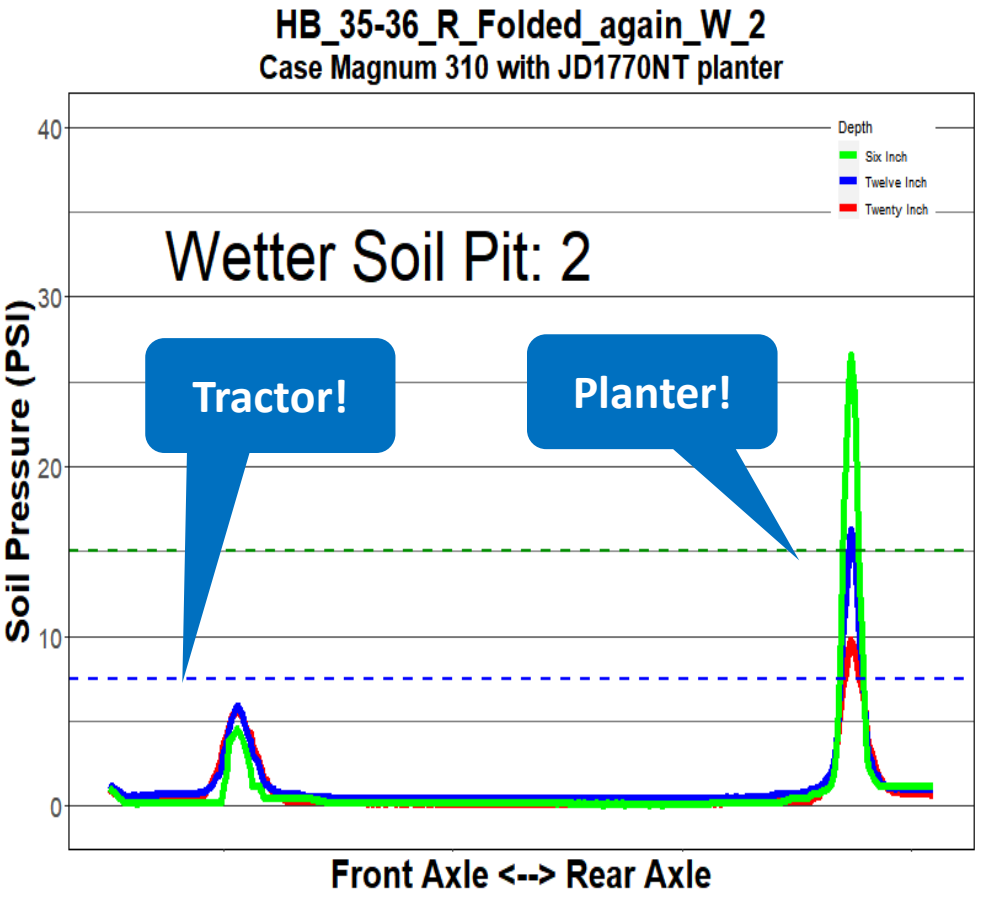
Corn Planter

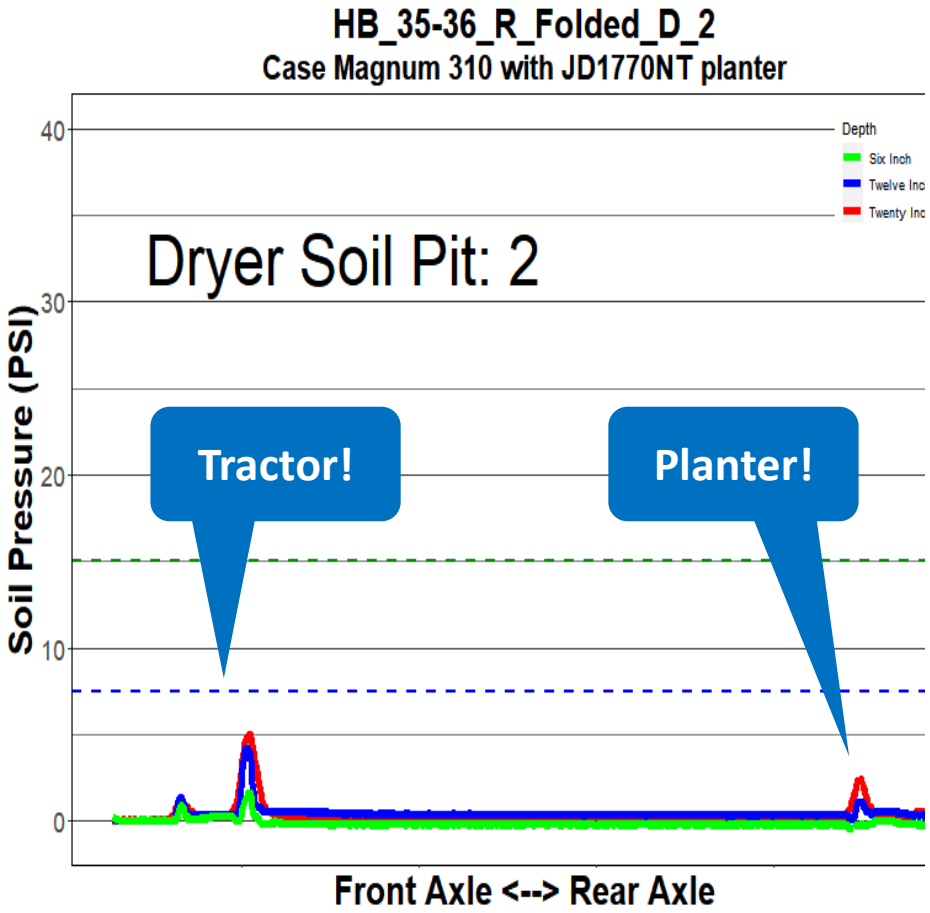
Empty or Loaded?

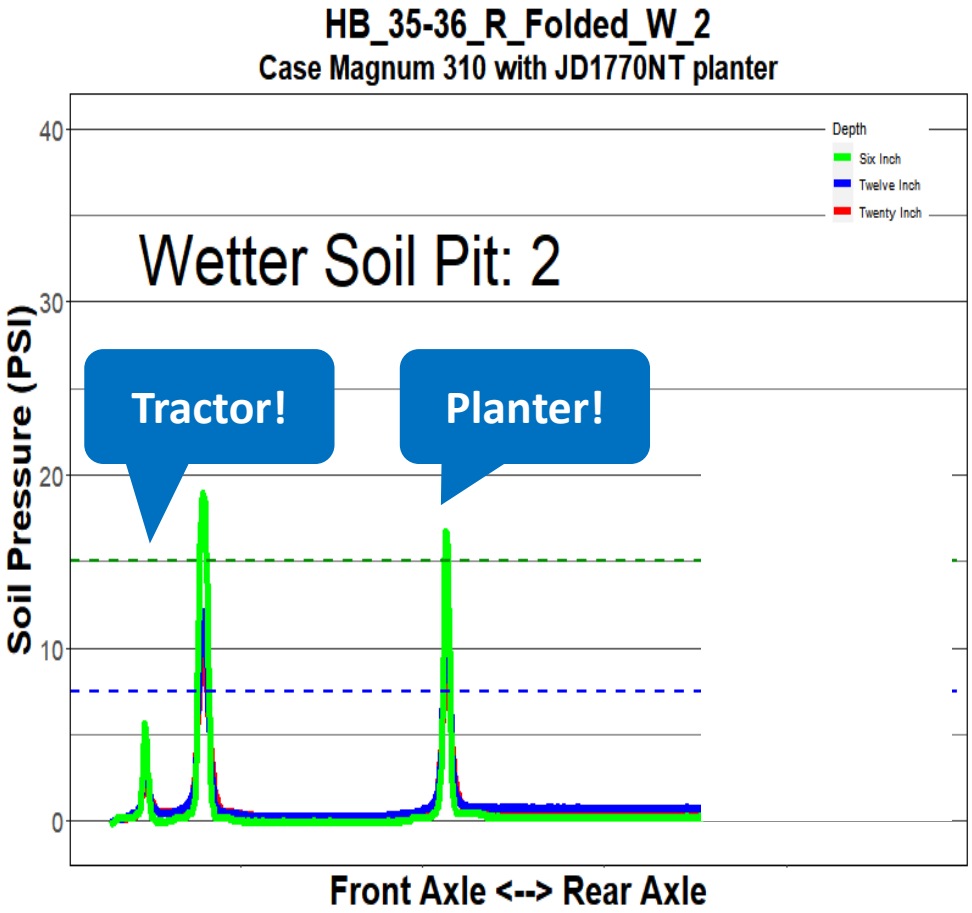
Road or Field?

CTIS: Yes / No?


HB_35-36_R_Folded_Again_D_2
Case Magnum 310 with JD1770NT planter
Dryer Soil Pit: 2
Tractor!
Planter!
Depth
Six Inch
Twelve I
Twenty I
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_35-36_R_Folded_again_W_2
Case Magnum 310 with JD1770NT planter
Wetter Soil Pit: 2
Tractor!
Planter!
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_35-36_R_Folded_D_2
Case Magnum 310 with JD1770NT planter
Dryer Soil Pit: 2
Depth
Six Inch
Twelve Inc
Twenty Inc
Tractor!
Planter!
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_35-36_R_Folded_W_2
Case Magnum 310 with JD1770NT planter
Wetter Soil Pit: 2
Depth
Six Inch
Twelve Inch
Twenty Inch
Tractor!
Planter!
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB35 + HB36

- Very difficult to line up with the sensors. Overall, very narrow tire with high tire pressure and high tire load when folded.
- Not the usual in field configuration, but shows that there is significant load under the main wheels when loaded.
- This data needs to be used with care since our normal practice of fully loaded equipment was not possible in this case.


Inflated!
Deflated!

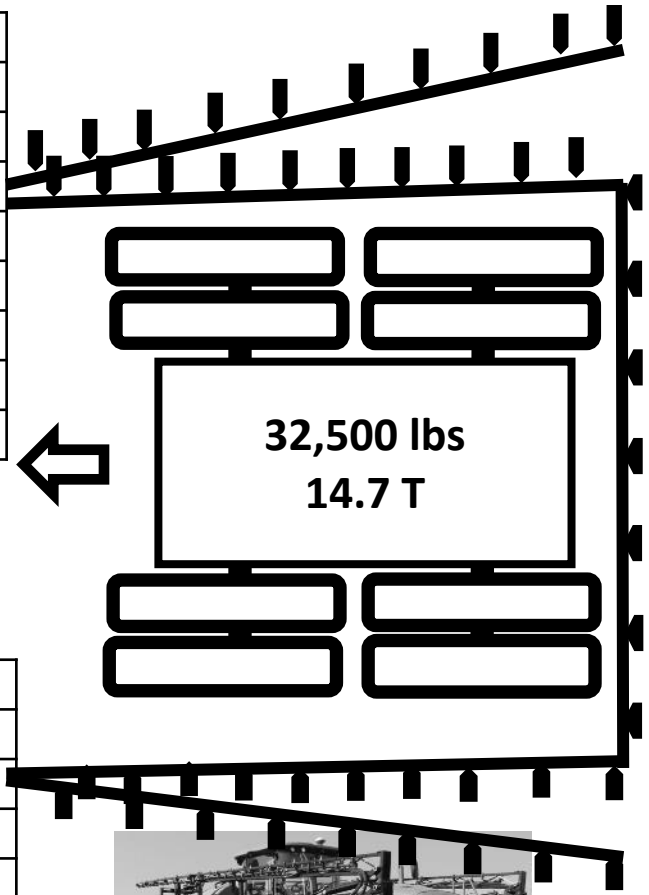
2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB37
Apache AS1050 SP Sprayer w 380F vs VF380 R Radial Tires


APACH

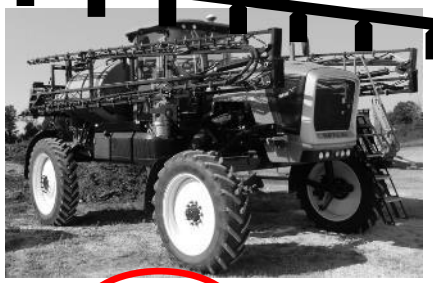
Exh#:	HB37	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Eggers	Phone#:
EquipType:	SP Sprayer	Make:	Apache	Model: AS1050

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Agribib 2	
Tire Type:	Radial	
Tire Size:	380/80R38	
TireWt (lbs):	4800	
Road PSI:	29	
Field PSI:	12	
OnArrival PSI	30	



INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Spraybib	
Tire Type:	VF	
Tire Size:	380/90R48	
TireWt (lbs):	11720	
Road PSI:	43	
Field PSI:	43	
OnArrival PSI	45.3	

INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Agribib 2	
Tire Type:	Radial	
Tire Size:	380/80R38	
TireWt (lbs):	4860	
Road PSI:	29	
Field PSI:	12	
OnArrival PSI	30	



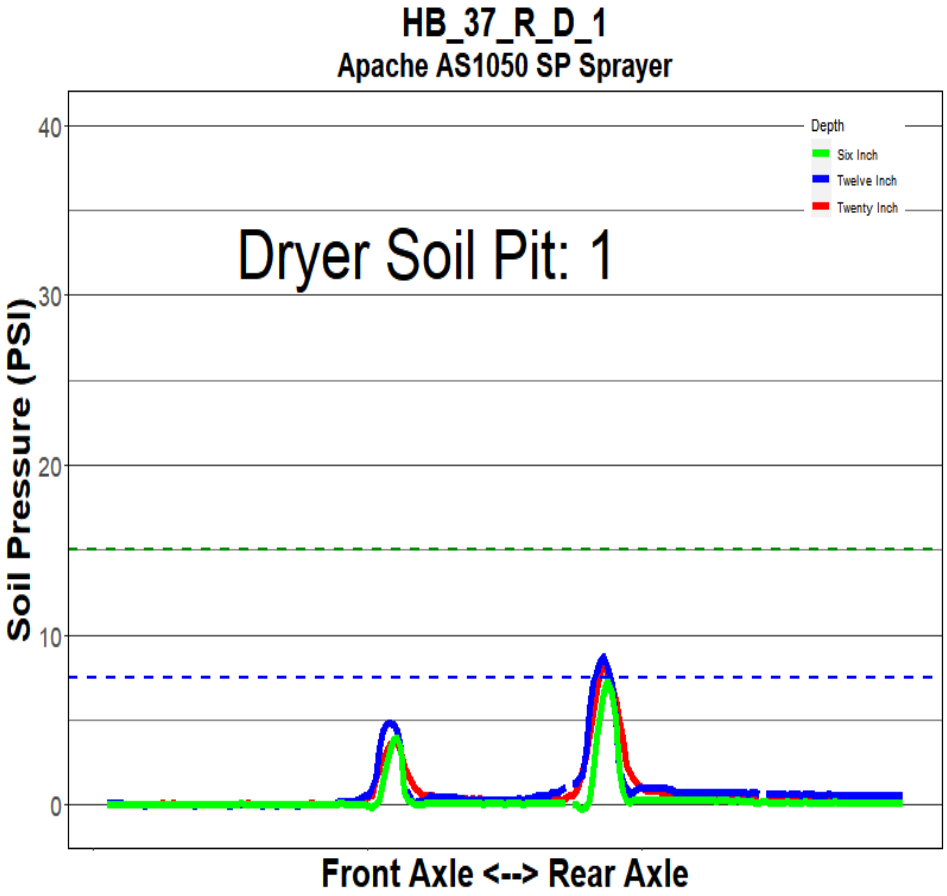
INFO	Inside	Outside
Tire/Trk Make:	Michelin	
Tire Model:	Spraybib	
Tire Type:	VF	
Tire Size:	380/90R48	
TireWt (lbs):	11120	
Road PSI:	43	
Field PSI:	43	
OnArrival PSI	45.9	

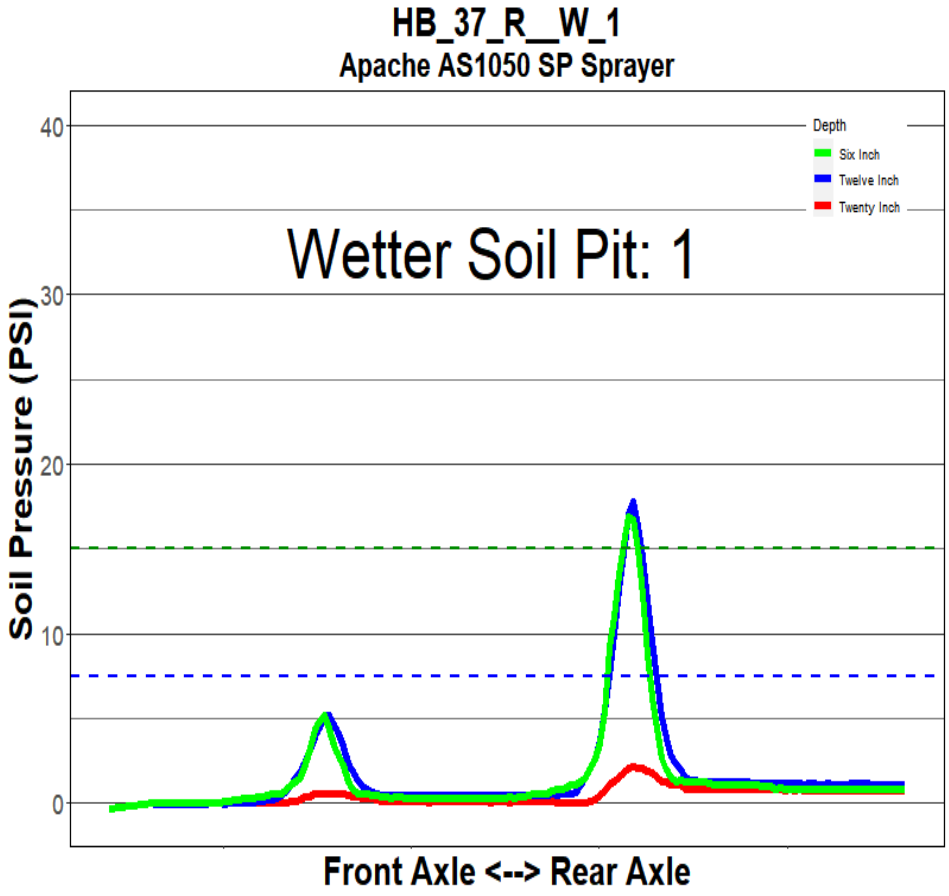
SP Sprayer – Rear Boom

Empty or Loaded?

Boom Road or Field?

CTIS: Yes / No?


HB_37_R_D_1
Apache AS1050 SP Sprayer
Dryer Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_37_R__W_1
Apache AS1050 SP Sprayer
Wetter Soil Pit: 1
Depth
Six Inch
Twelve Inch
Twenty Inch
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB37

- This unit is not well balanced front to rear, however that is due to the design of the mechanical drivetrain.
- Typical response for a SP sprayer ~11,000lb wheel load with high tire pressure and narrow tires.
- Showing that narrower tires on dryer soils during the summer months is less of an issue than if these same tires are used during early spring and fall when soil conditions are typically wetter.
- SP sprayers should routinely be setup with narrow and wider tire options depending on the time of year and CTIS Systems are an important consideration to optimize these implements.


APACHE


APACHE

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB40
Ford F250 Pickup Truck


HB40
Ford
148-8FV

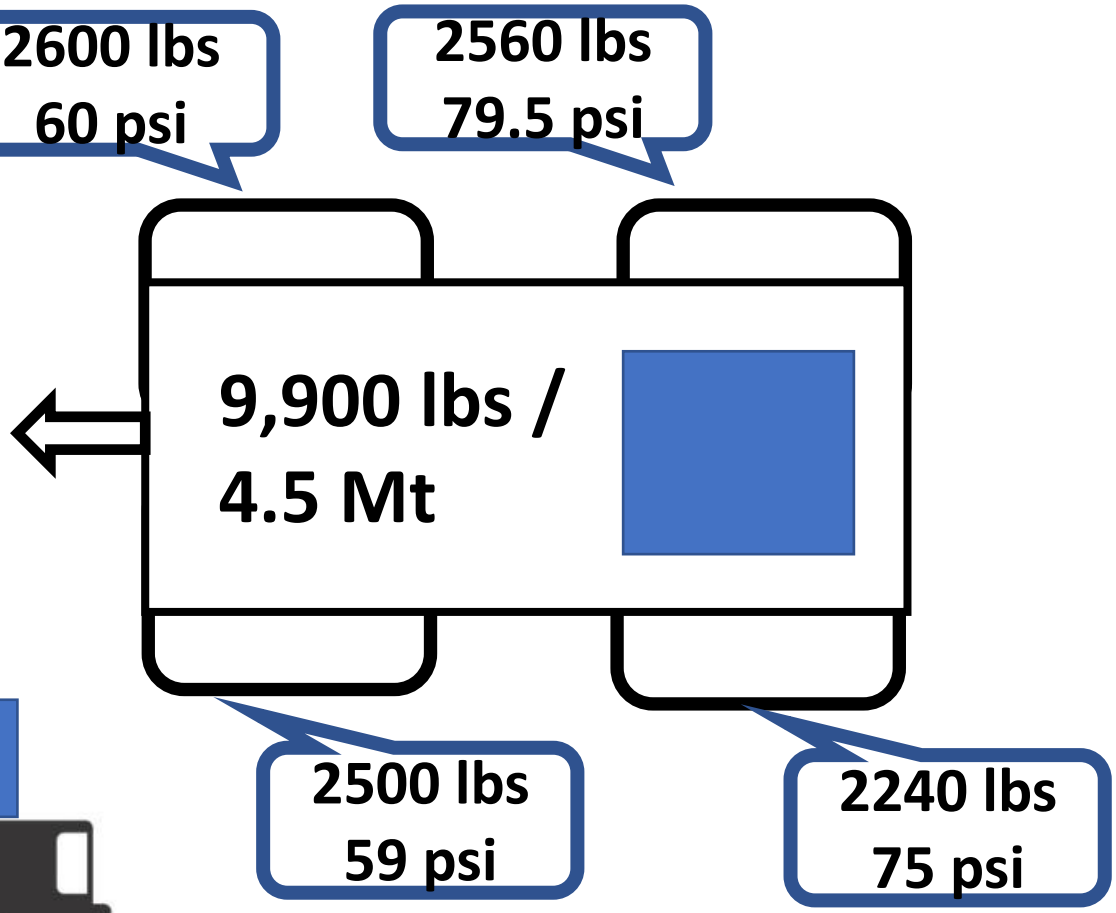
HB40

BF Goodrich All Terrain

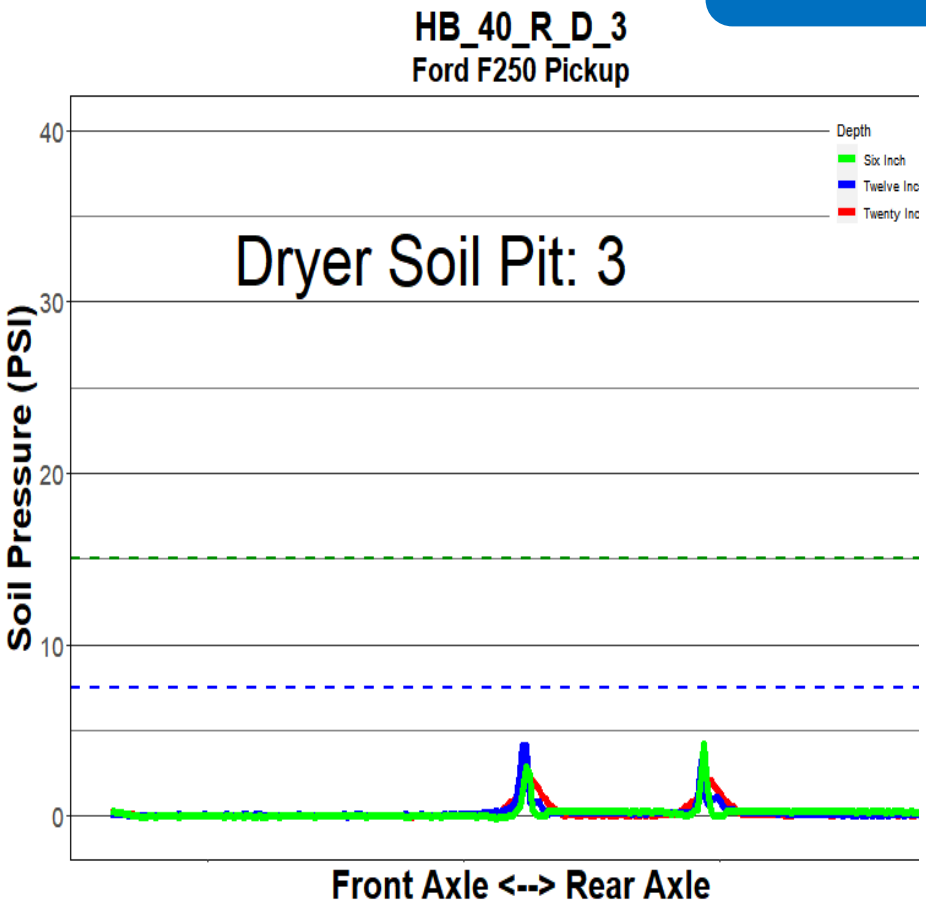
35X12.5 R20 LT

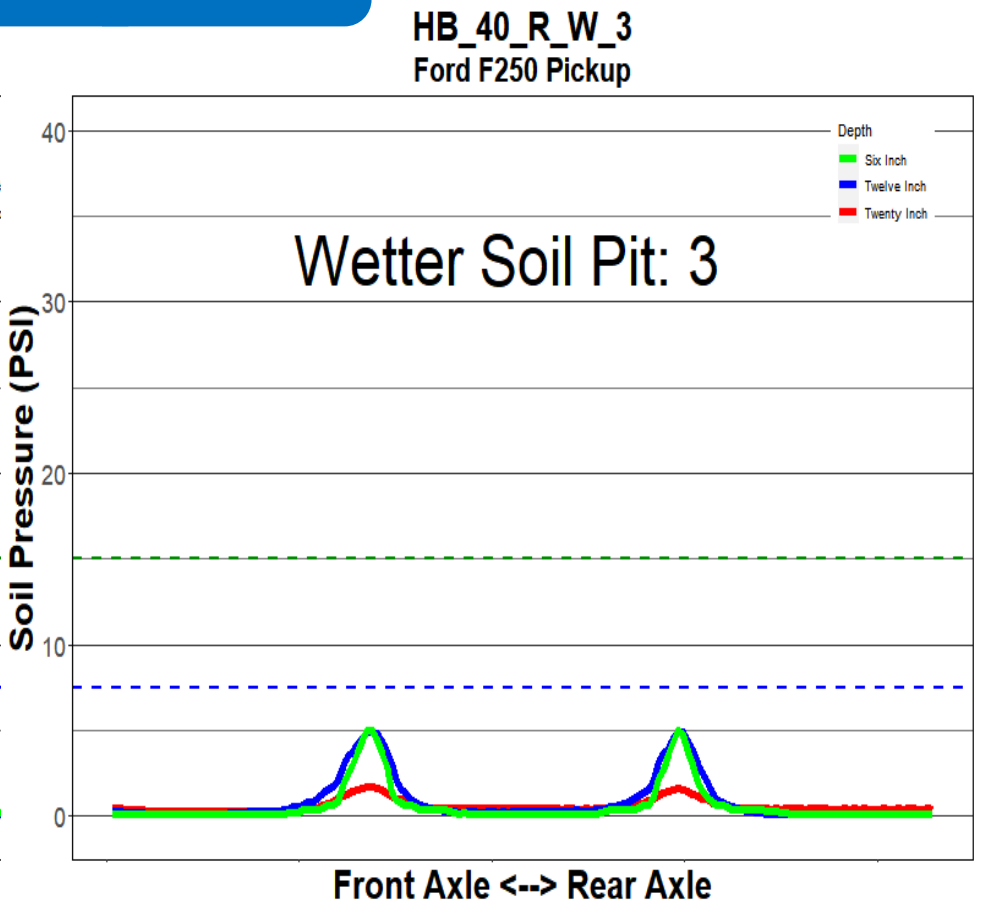
Ford FX4 Off-Road

Fuel tank full

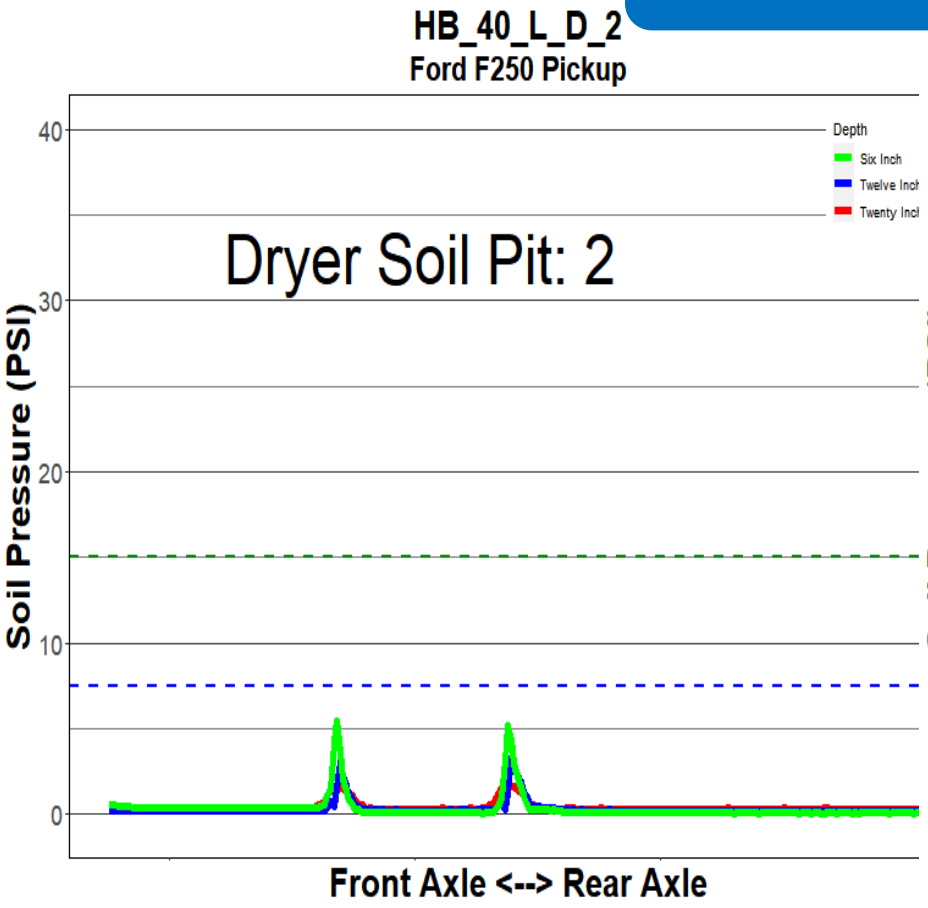


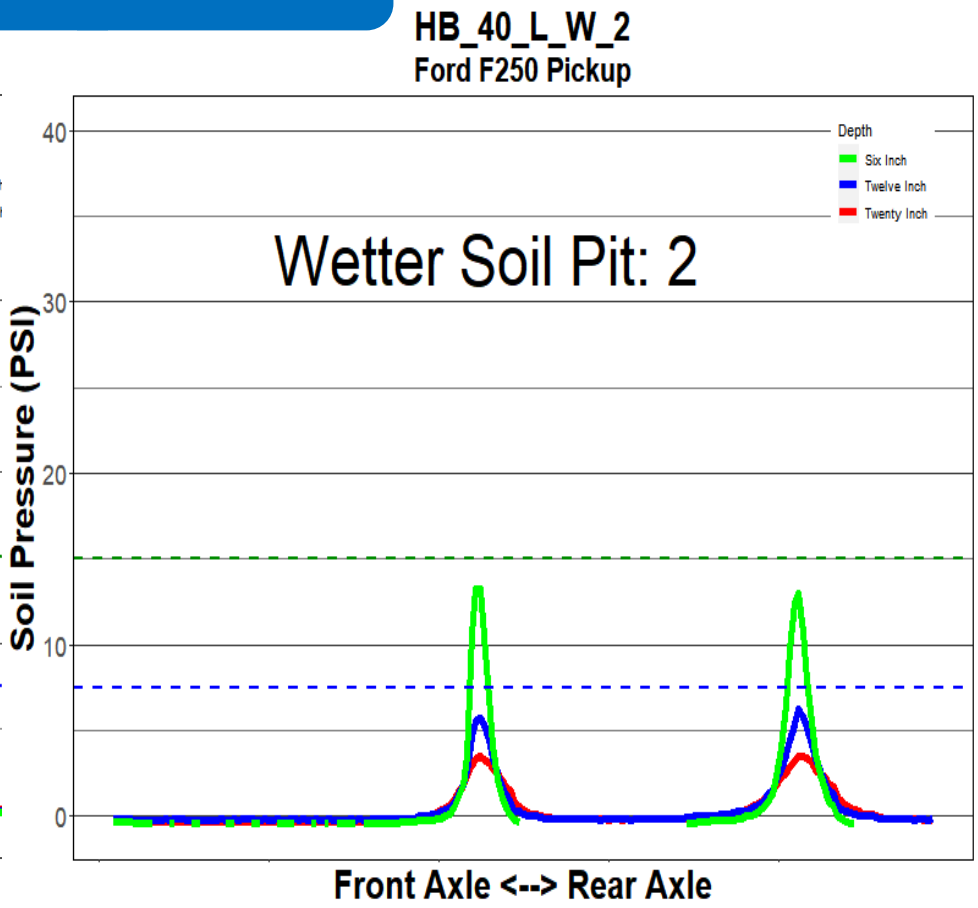
Truck Bed Empty





Truck Bed Loaded





Data Comments – HB40

- Narrow truck tires are a challenge to line up with the sensors (Soil Pits 3), but topsoil stress is similar to a wagon. Same effect of small, high pressure tires.
- Pickup trucks with their beds loaded and under wet soil conditions can result in soil stress as high as some much heavier farm equipment.
- Truck tires tend to be high PSI rated vs farm equipment tires which is the main issue for field use.


PLATINUM
FX4
148-8FV

2022 Hamilton-Brant SCIA Compaction Event

Exhibit: HB41 Pull Type Dry Fertilizer Spreader w Tandem Bias 16.5 Tires


91
91
BBI

Exh#:	HB41	ExhNote:		AB-diff psi, LR-diff tires, W1W2-diff wts
ExhName:		OwnerName:	Clarks	Phone#:
EquipType:	Dry Fertilizer Spreader		Make:	Model:

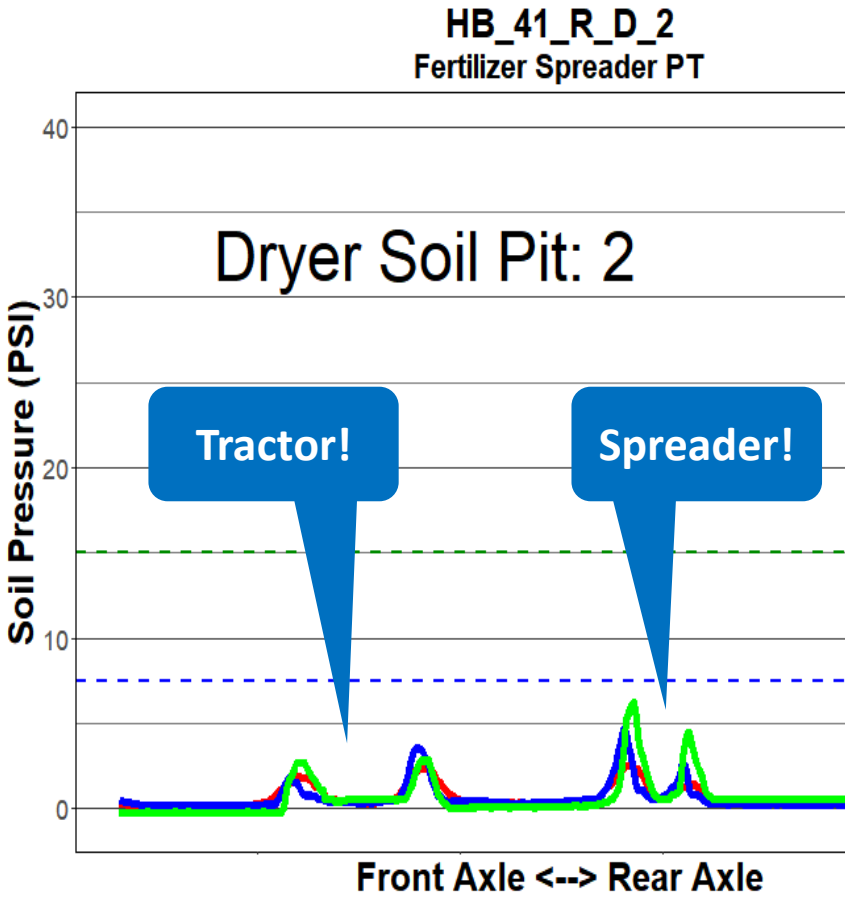
INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Galaxy	Firestone				
Tire Model:	ImpMaster200					
Tire Type:	Bias	Bias				
Tire Size:	16.5L-16.5L	16.5L-16.1L				
TireWt (lbs):	3360	2580				
Road PSI:	36	36				
Arrival PSI:	18	22				

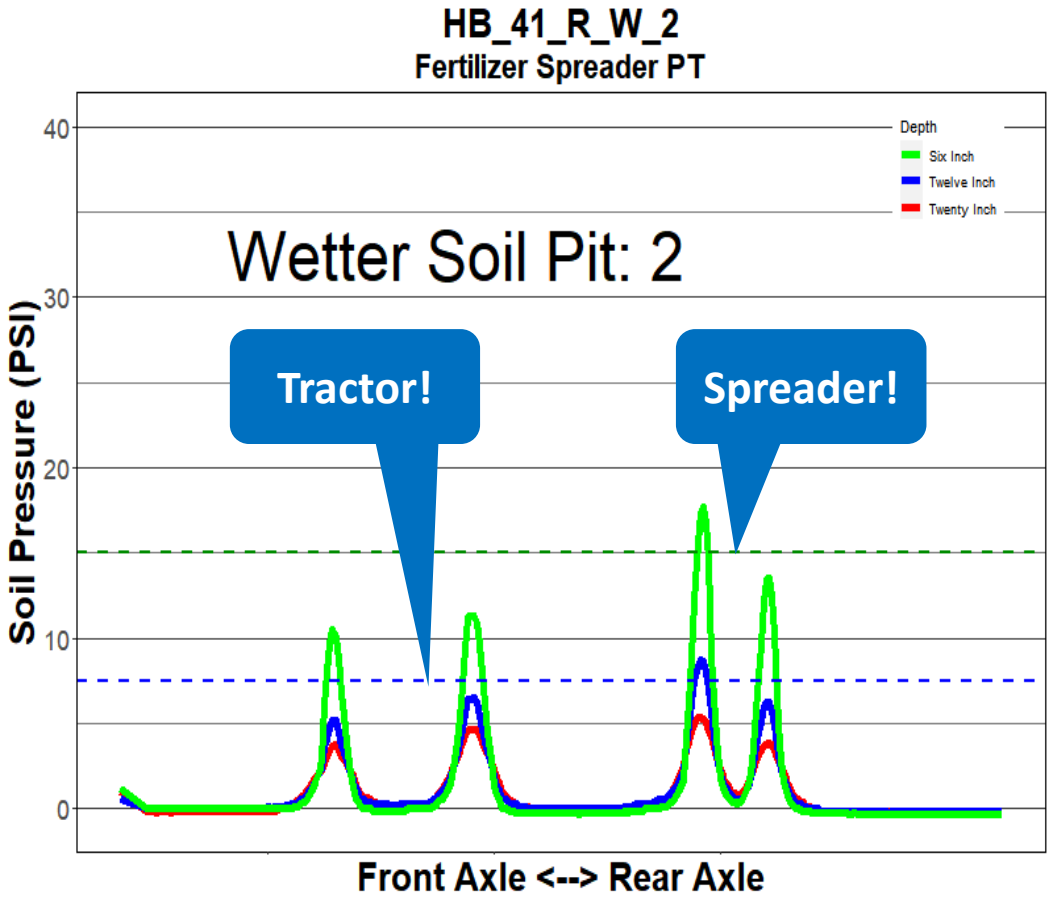
Empty or Loaded?

CTIS: Yes / No

Large Wagons / Trailers / Tanks / Etc

INFO	Axle 1	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6
Tire/Trk Make:	Firestone	Firestone				
Tire Model:						
Tire Type:	Bias	Bias				
Tire Size:	16.5L-16.1L	16.5L-16.1L				
TireWt (lbs):	3160	1900				
Road PSI:	36	36				
Arrival PSI:	23	16				


HB_41_R_D_2
Fertilizer Spreader PT
Dryer Soil Pit: 2
Tractor!
Spreader!
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle


HB_41_R_W_2
Fertilizer Spreader PT
Depth
Six Inch
Twelve Inch
Twenty Inch
Wetter Soil Pit: 2
Tractor!
Spreader!
Soil Pressure (PSI)
40
30
20
10
0
Front Axle <--> Rear Axle

Data Comments – HB41

- Spreader had 4t of dry fertilizer onboard.
- Bias ply tire would not be the first choice for this unit, since they should be set for road pressure. Radial tires would at least allow a lower pressure.
- Notice the unit is not well balance front to back, increasing the load on the front axle.
- Due to the nature of their construction, bias tires must be maintained at high PSI relative to similar sized radial tires.
- In the pictures following note the roundness of the tire which often does not distribute the weight evenly across the width of the tire.


BBI
HB41
91
50 FT.
Spread Width


BBI
HB41
91
50 FT.
Spread Width


91


Bridgestone


FLOTATION 500