2019 Dundas SCIA Compaction Event

Winchester, Ontario

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Dundas SCIA Compaction Event

- Dundas's compaction event was the second one conducted by the Ontario Soil Compaction Team.
- The soil at the site was a Tuscola Silt although most would classify it as a clay.
- 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 each sensing demonstration. Equipment submitted for testing was only sensed on the wetted pit.
- Prior to the event, water was applied to small parts of the field to wet the soil via sets of four 1000L totes arranged in a square with small holes drilled in the bottom of each. At more recent events the Team has created twin sets of sensor pits to compare wetted soil with the current soil conditions post wheat harvest. Several sets of pits were created so that we had lots of redundancy for comparing all the equipment supplied for testing. These sets of twin pits were marked to keep any but the test traffic off to reduce any chance of other pass effects impacting the results.
- The area watered needed to be longer and wider than any individual track or tire to be tested across the sensors to ensure that dry soil at the edge of the wet sensor pit was not supporting part of the weight of the implements compared to the wet portion of the area of the sensors which would skew the responses.
- 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 depth targets are correct, but when the sensors are uninstalled we check each depth and from all installations and they have been within 1" for each target depth at each event.
- Sensors were connected to a large display screen to share with the audience 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 not compaction.
- Pressure is used as a proxy of compaction susceptibility and is not a direct measure of soil compaction.

Site Soil Details

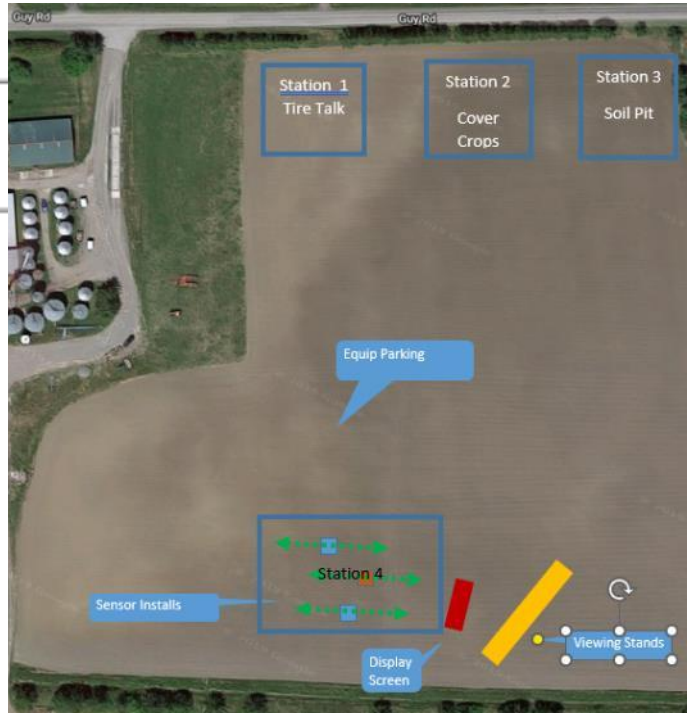
- The soil at the site was a primarily Brandon soil with a Clay Loam surface and Silty Clay B Horizon according to the county soil map.

Ontario Soils Maps – OMAFRA Agmaps

Morphological Description, BRANDON SERIES

Horizon	Depth (range) cm	Colour moist-m dry-d	Texture
Ap	0-20 (19-21)	10YR 3/2 m	CL
Bg1	20-31 (10-12)	10YR 5/1 m	SIC
Bg2	31-55 (23-24)	10YR 4/1 m	C
Cg1	55-67 (11-12)	10YR 5/1 m	SIC
Cg2	67+	5Y 5/1 m	C

Site Layout



https://www.lioapplications.lrc.gov.on.ca/AgMaps/Index.html?viewer=AgMaps.AgMaps&locale=en-CA

Site Soil Details (cont.)

Physical and Chemical Analyses, BRANDON SERIES

Horizon	Depth cm	% Grav. >2 mm	Sand Fraction % vCS 2-1 mm	CS 1-.5 mm	MS .5-.25 mm	FS .25-.1 mm	VFS .1-.05 mm	Sand %	Silt %	Clay %	Fine Clay % <0.2μ	Bulk Dens. g/cm^3	Poro-sity %	% Moisture Retention(g/g) 0 kPa	5 kPa	33 kPa	1500 kPa	Hydr. Cond. cm/hr	Elec. Cond. mmhos/cm
Ap	0-20	0	1	1	2	7	19	30	38	32	13	1.28	48	41.8	29.1	24.2	19.2	21.0	0.2
Bg1	20-31	0	1	1	2	7	9	20	40	40	12	1.51	38	31.2	26.1	21.7	17.4	2.5	0.1
Bg2	31-55	0	18	2	1	1	1	22	35	43	8	1.44	41	39.5	32.5	27.9	22.8	8.3	0.1
Cg1	55-67							6	40	55		1.47	41	37.1	32.4	28.9	24.4	5.9	0.1
Cg2	67+							11	36	53		1.44	60	39.5	34.6	31.1	26.5	2.1	0.1

Physical and Chemical Analyses, BRANDON SERIES (continued)

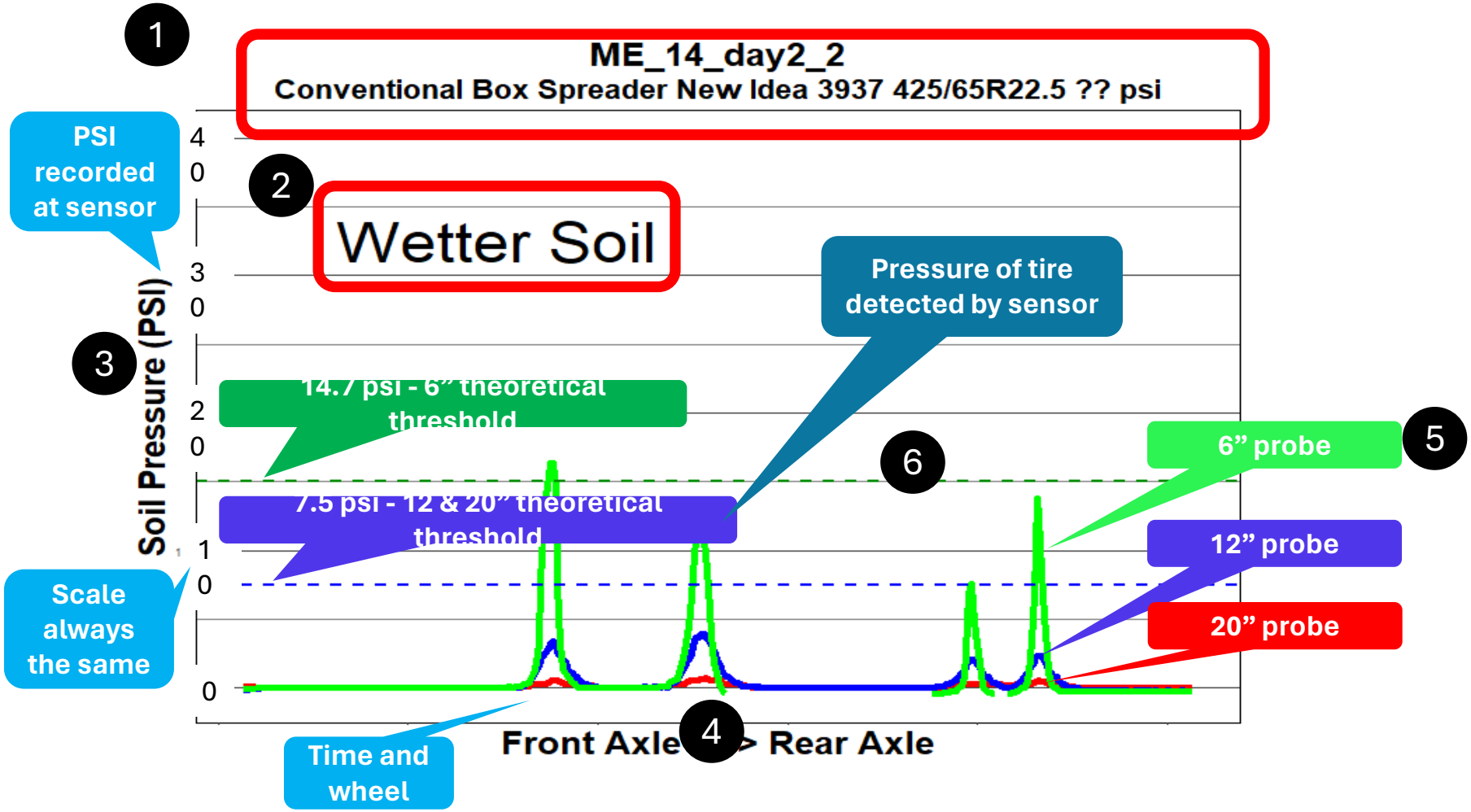
Horizon	Depth cm	pH in H_2O	pH in $CaCl_2$	Or-ganic Matter %	$CaCO_3$ Equiv. %	Cal/Dol Ratio	C.E.C. me/100g	Exchangeable Cations (me/100g) Na	Ca	Mg	K	Avail-able P ppm	Fe, Al and Mn % Oxalate Fe	Oxalate Al	Oxalate Mn	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn
Ap	0-20	7.2	6.6	3.6	0.5		51.0	0.6	10.5	13.3	0.3	3.0	0.6	0.1		0.1		
Bg1	20-31	7.4	7.1	0.9	0.3		53.0	0.7	11.5	16.5	0.4	1.0	0.4	0.2	0.1			
Bg2	31-55	7.6	7.3	0.4	0.4		53.0	1.0	11.5	17.6	0.5	1.0	0.3	0.2	0.1			
Cg1	55-67	7.8	7.0	0.4	0.9		54.0	1.0	11.0	17.6	0.7	2.0	0.2	0.2				
Cg2	67+	7.9	7.0	0.3	0.7		52.0	0.8	10.5	14.9	0.7	3.0	0.2	0.2				

https://sis.agr.gc.ca/cansis/publications/surveys/on/on58/on58-v2_report.pdf pg 20. Further info on these soils in Report 1on pg 36-37 of Vol 1 (on58/on58-v1).

Interpreting the Data

- The data collected at these events is not rigorously collected scientific data but its aggregation across all events shows trends that can direct us in the correct path to lower our risk of soil compaction.
- But the data collected 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 and 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

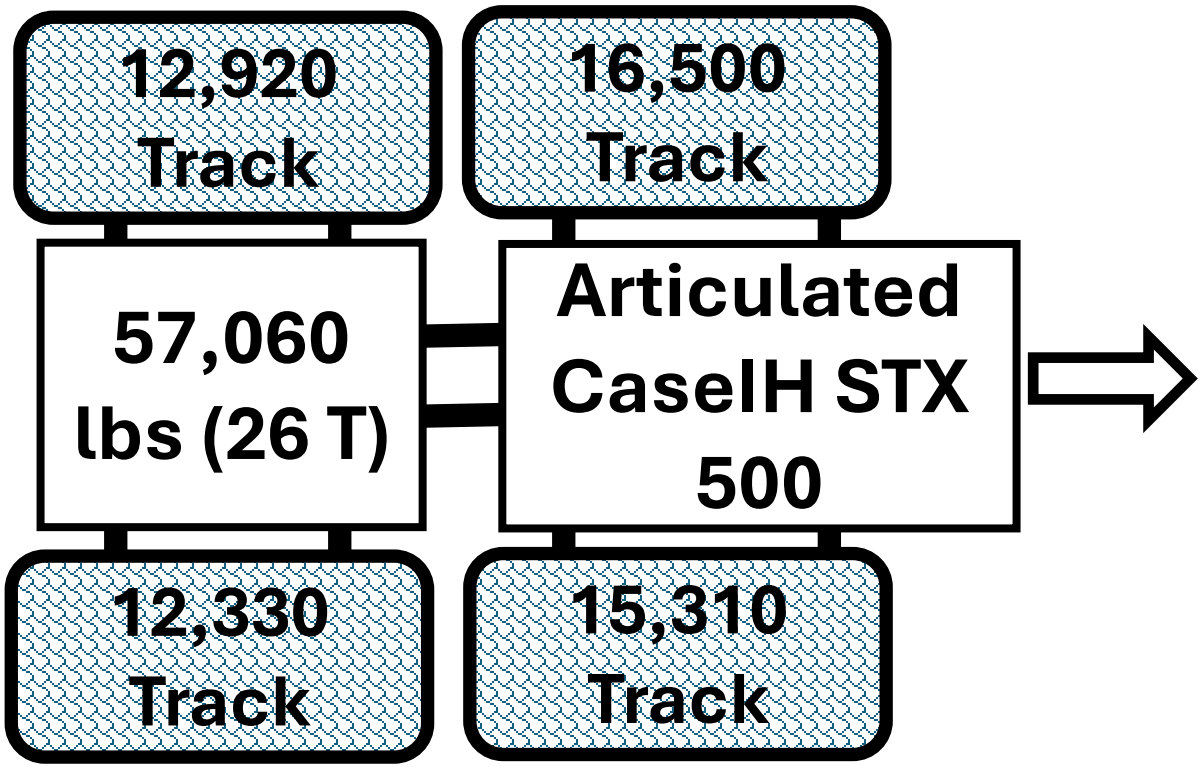
The management decisions listed that can reduce soil compaction are in no particular order.

2019 Dundas Soil and Crop Compaction Event

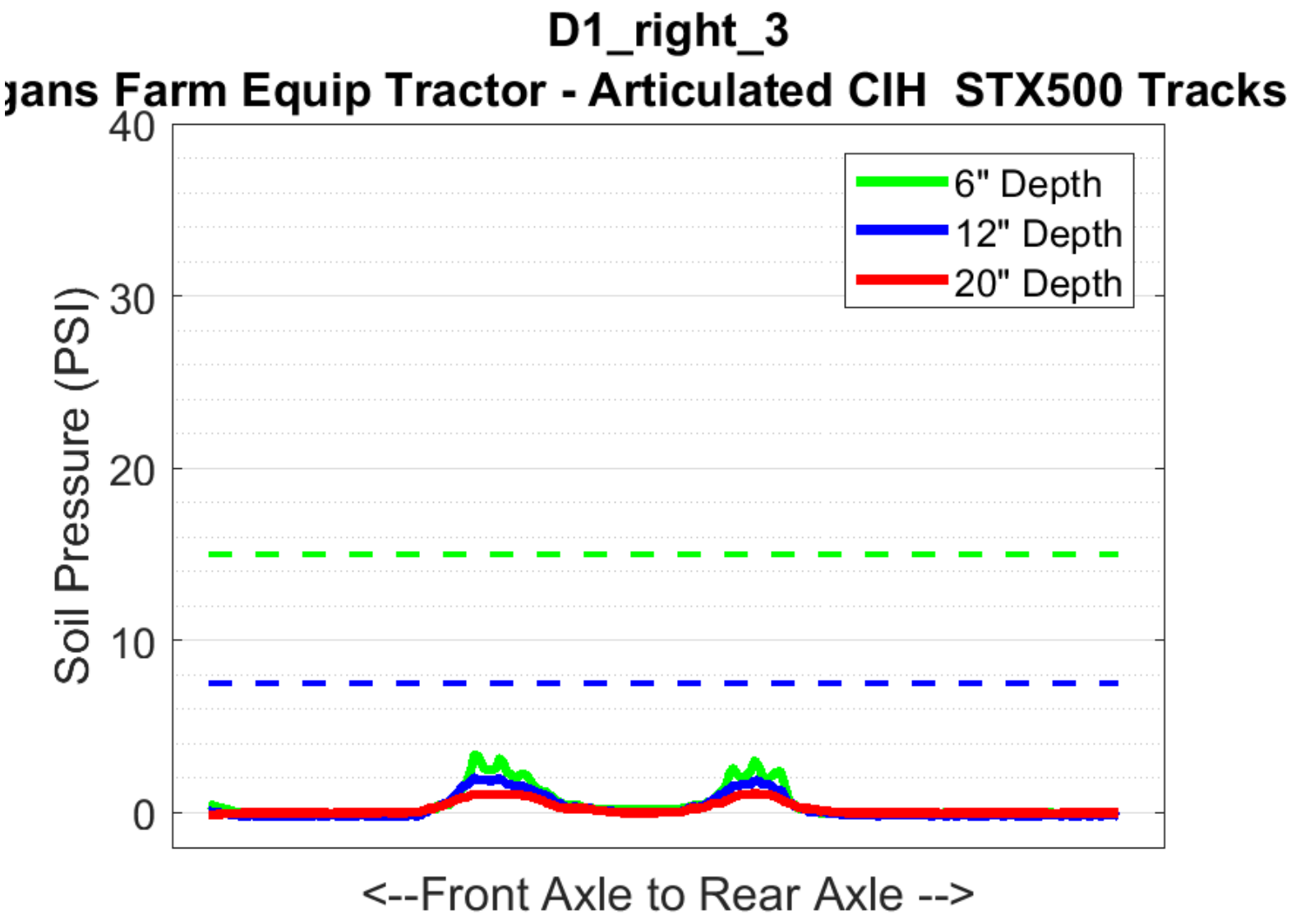
Exhibit: D1
CaseIH Quadtrak STX500 Tracked Articulated Tractor


1
CASE IH

Exh: D1


12,920
Track
16,500
Track
57,060
lbs (26 T)
Articulated
CaseIH STX
500
12,330
Track
15,310
Track


CASE IH
500


D1_right_3
gans Farm Equip Tractor - Articulated CIH STX500 Tracks
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments –D1

- This is a curved bottom track
  - Notice how there are only 3 peaks on each curve, corresponding to the small rollers on each track unit.
  - The hard ground conditions meant the track was not bearing on the entire surface.
- The deeper pressures are a concern with this amount of weight.
- But in this situation the stress transferred into the soil was suitable for the soil in terms of avoiding compaction under these conditions.

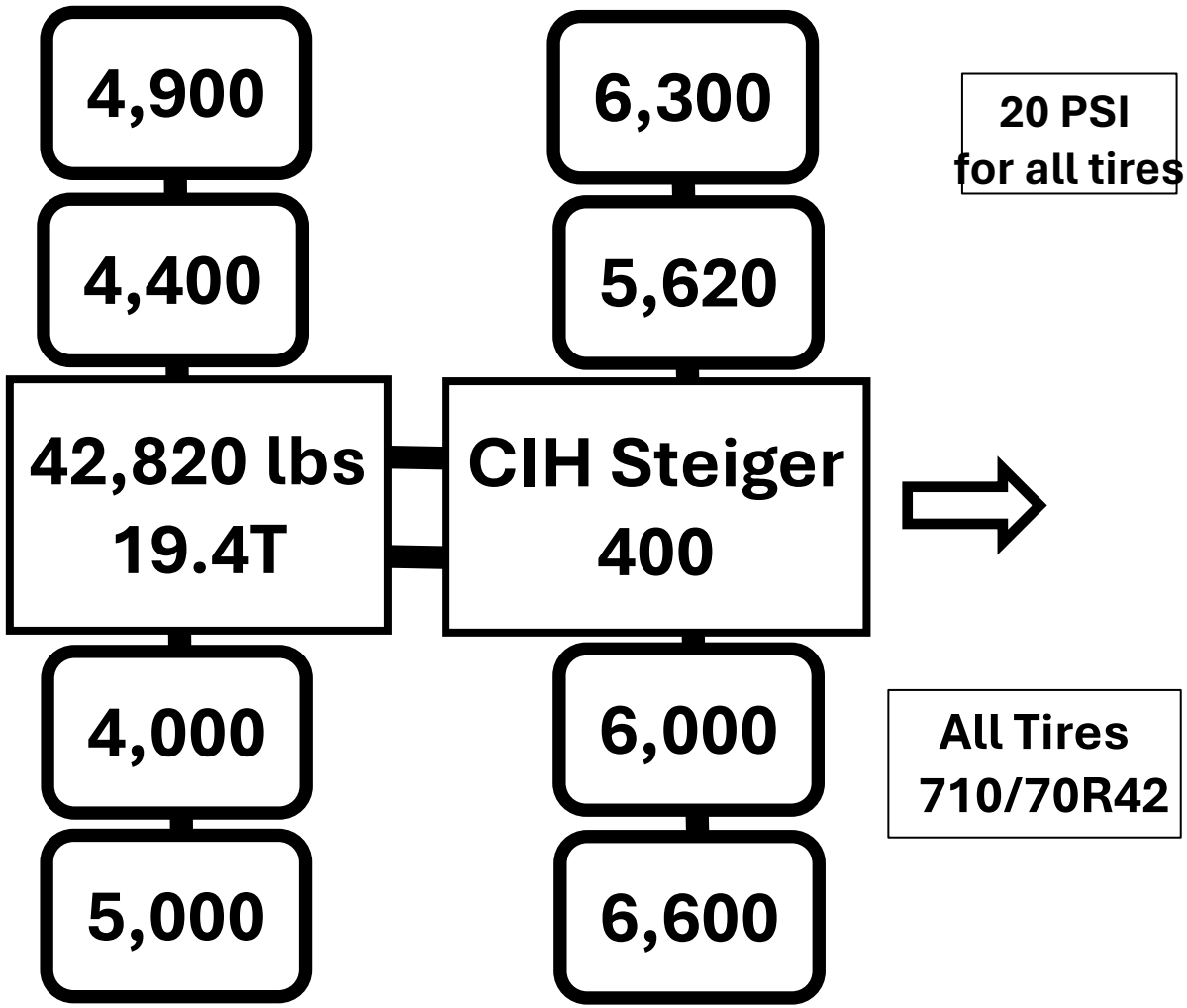

CASE
500

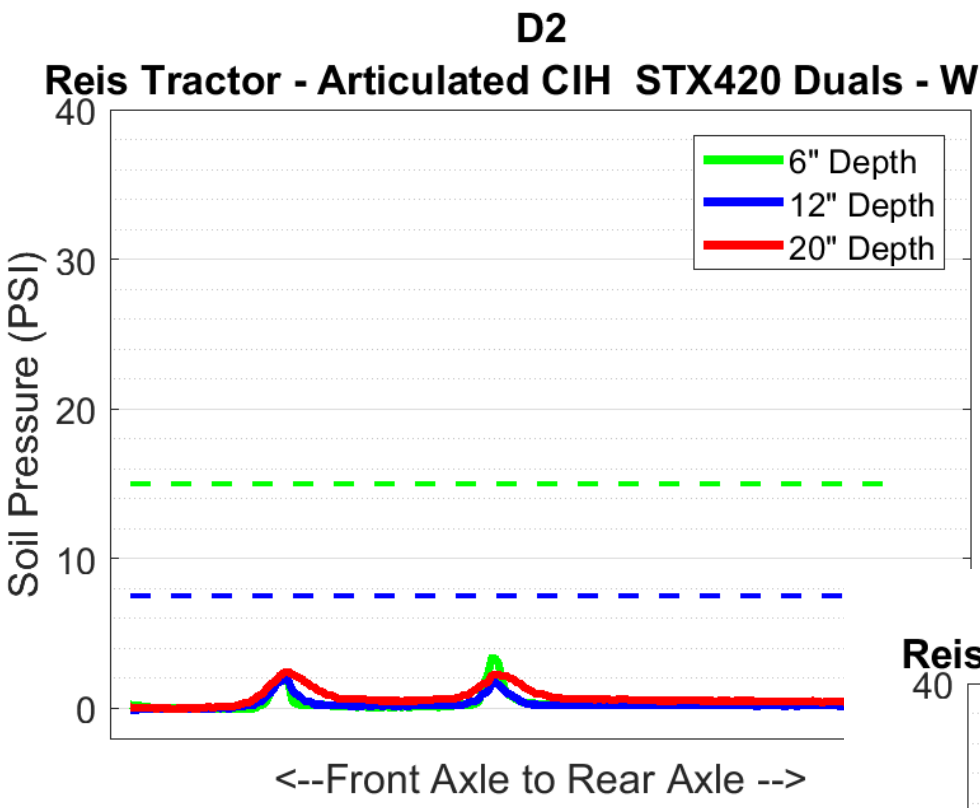
2019 Dundas Soil and Crop Compaction Event

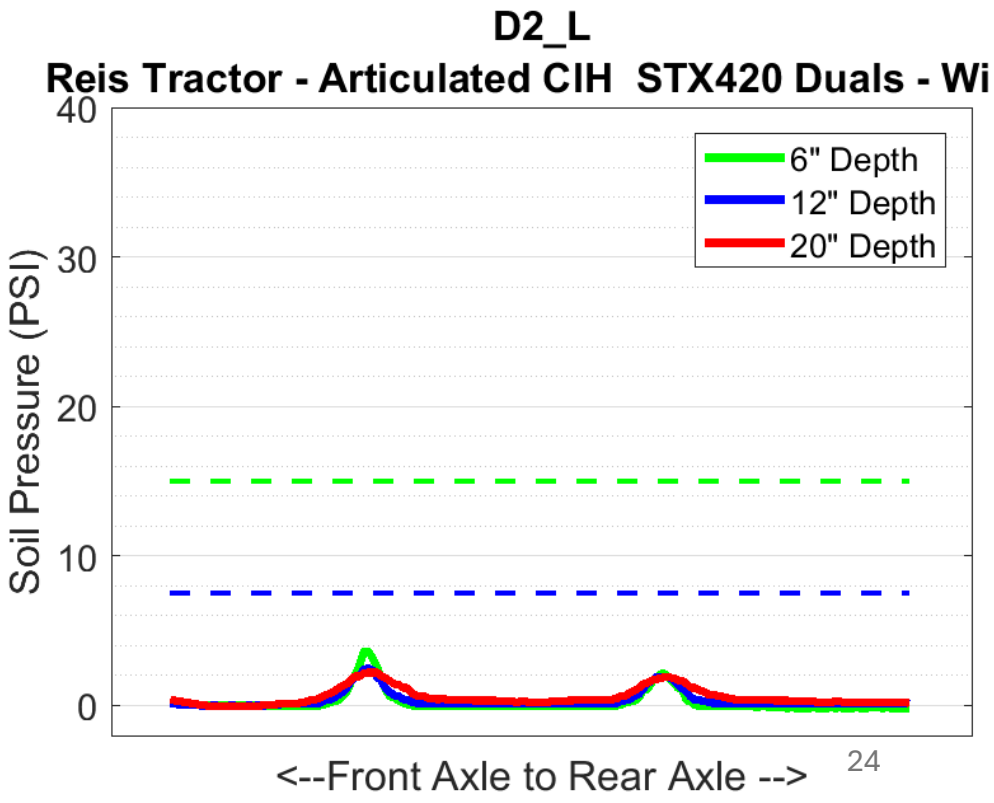
Exhibit: D2
CaseIH Steiger 400HD Dualled Articulated Tractor w710s


2
CASE

Exh: D2


4,900
4,400
42,820 lbs
19.4T
4,000
5,000
6,300
5,620
CIH Steiger
400
6,000
6,600
20 PSI
for all tires
All Tires
710/70R42


D2
Reis Tractor - Articulated CIH STX420 Duals - Wi
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D2_L
Reis Tractor - Articulated CIH STX420 Duals - Wi
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments - D2

- This Unit was tested at the _3 installation.
- This is a wheel tractor, comparable stress at depth effect compared to D1 (tracked articulated Steiger) as even accounting for lighter axle weight


400


CASE
400
STEIGER

2019 Dundas Soil and Crop Compaction Event

Exhibit: D3
CaseIH Steiger 420 Tracked Articulated Tractor


3
CASE

Exh: D3

12,100
84 X 24”

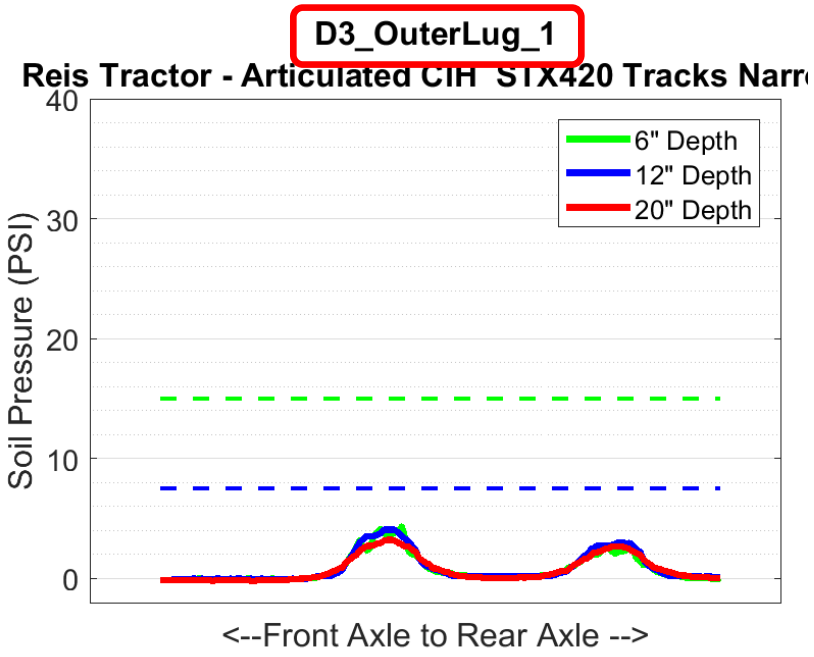
16,200
84 X 24”

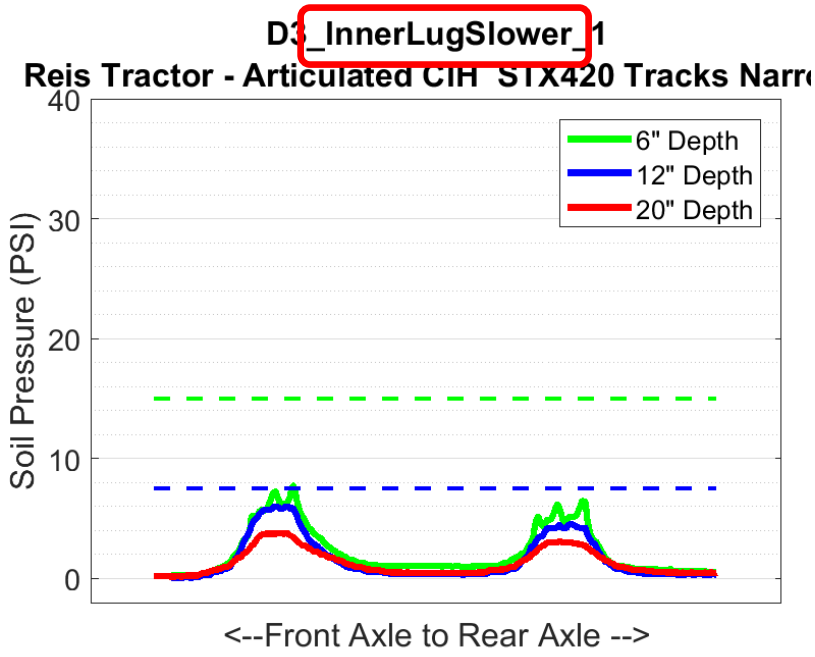
55,200
lbs / 25T

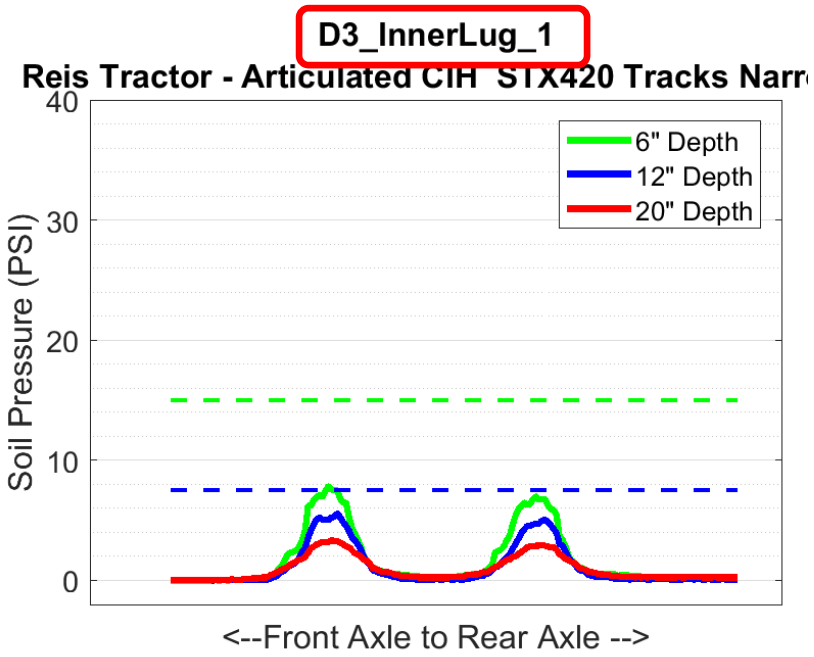
CIH 420
Quadtrac

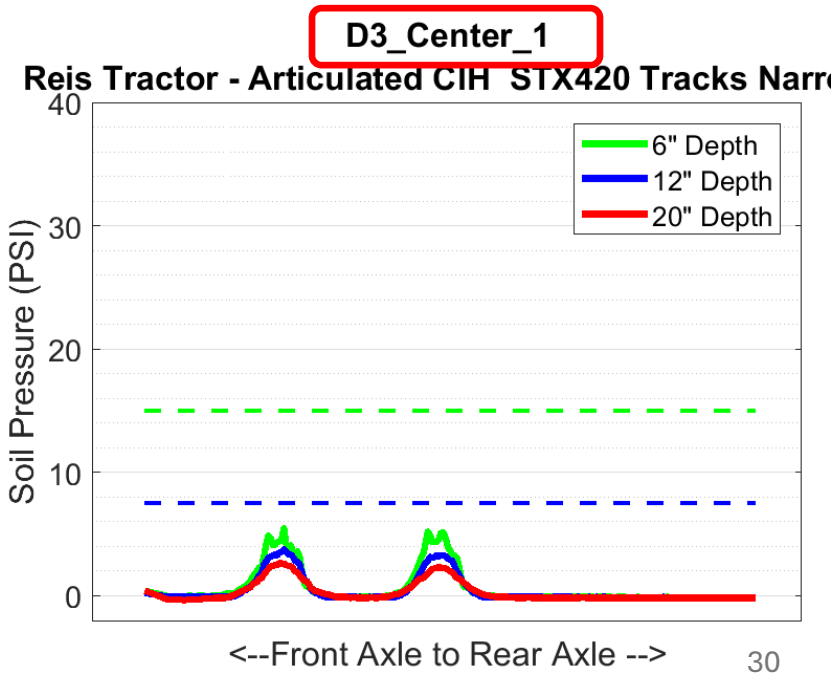
12,080
84 X 24”

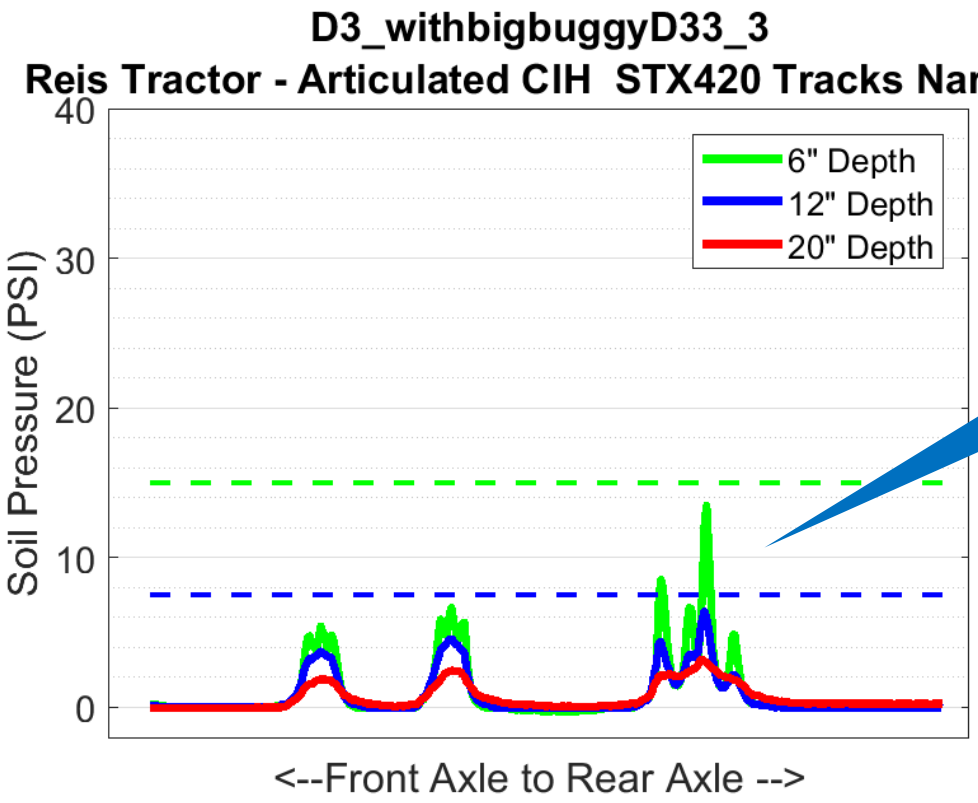
14,820
84 X 24”


D3_OuterLug_1
Reis Tractor - Articulated CIH STX420 Tracks Narr
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

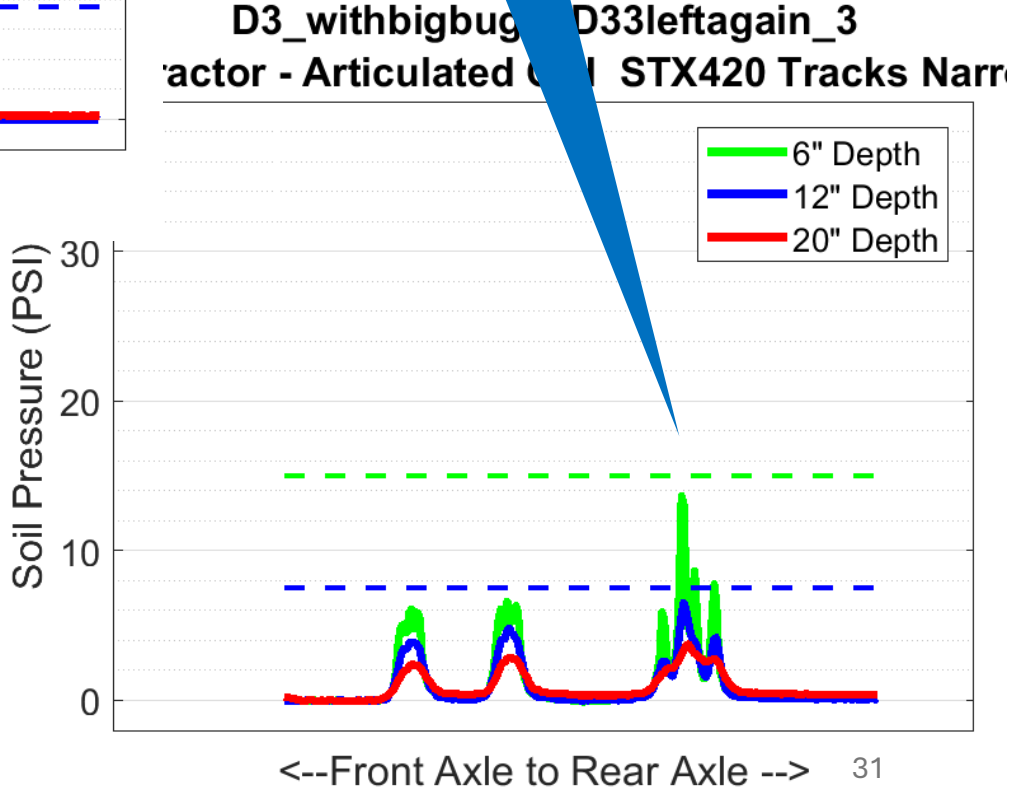

D3_InnerLugSlower_1
Reis Tractor - Articulated CIH STX420 Tracks Narr
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D3_InnerLug_1
Reis Tractor - Articulated CIH STX420 Tracks Narr
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D3_Center_1
Reis Tractor - Articulated CIH STX420 Tracks Narr
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D3_withbigbuggyD33_3
Reis Tractor - Articulated CIH STX420 Tracks Narr
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

Grain Buggy


D3_withbigbug D33leftagain_3
actor - Articulated STX420 Tracks Narr
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
<--Front Axle to Rear Axle -->

Plot Comments – D3

- This is a good configuration for compaction avoidance.
- Similar results to D1 and D2, this unit we tested the distribution underneath the track.
- The sensor was aligned under the outer lug, inner lug and down the center of the track.
- The center of the track had slightly lower stress since there was no direct contact to the rollers.
- Also notice how only the mid rollers carried the weight of the machine.
- The grain buggy was a tracked unit. Notice the higher stress at all depths which is a concern with very heavy implements.


CASE
QUADTRAC
420

2019 Dundas Soil and Crop Compaction Event

Exhibit: D4
New Holland T8.380
w 1100 LSWs


4

Exh: D4

8,640
LSW
1100/45R46

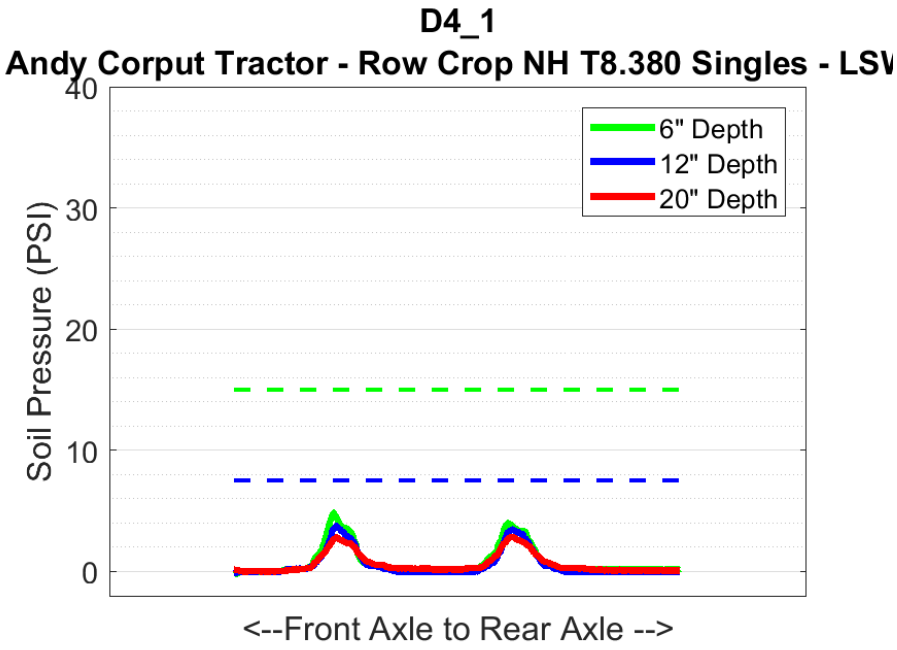
7,920
LSW
1000/40R3
2

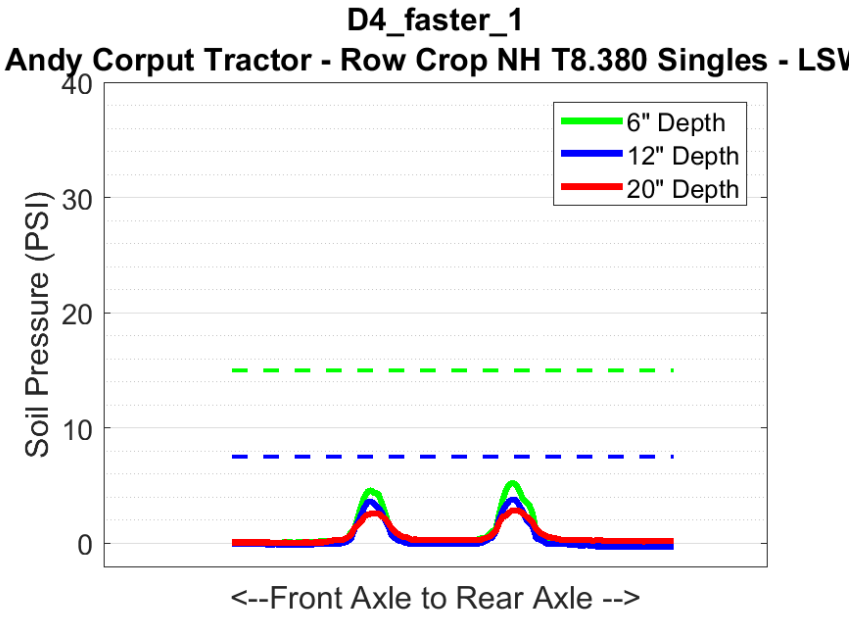
6 PSI for
all tires

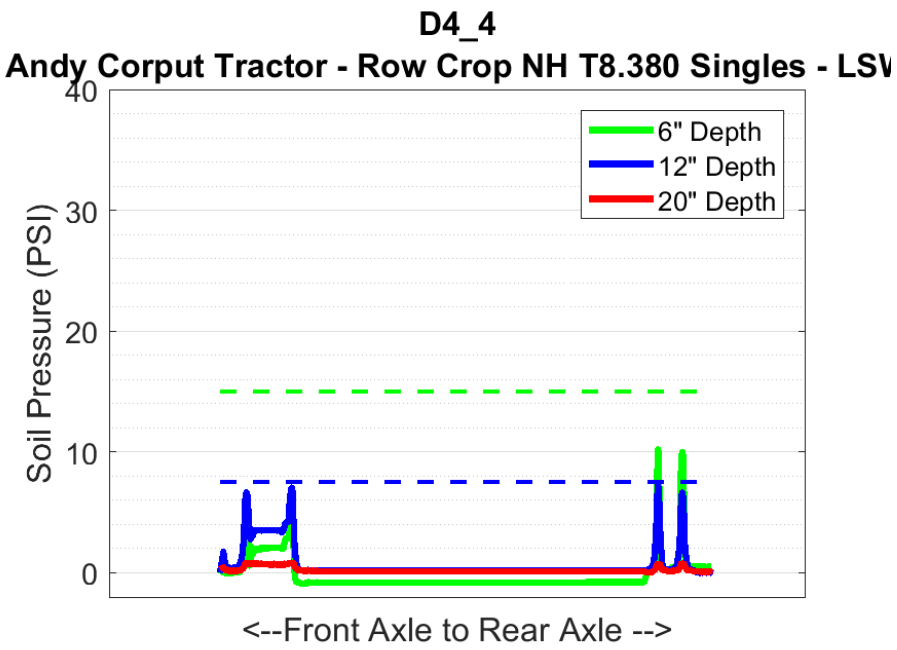
NH T8.380
33,180 lbs (15T)

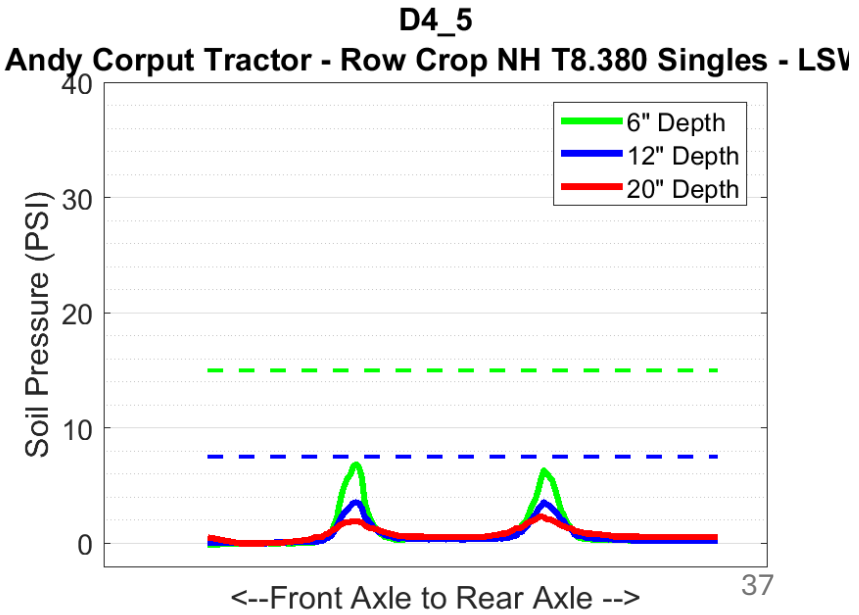
8,980
LSW
1100/45R46

7,640
LSW
1000/40R3
2


D4_1
Andy Corput Tractor - Row Crop NH T8.380 Singles - LSV
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D4_faster_1
Andy Corput Tractor - Row Crop NH T8.380 Singles - LSV
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D4_4
Andy Corput Tractor - Row Crop NH T8.380 Singles - LSV
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D4_5
Andy Corput Tractor - Row Crop NH T8.380 Singles - LSV
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

Plot Comments – D4

- Even with the large tires on this tractor, the total weight is still causing stress at depth.
- Stress at the surface is significantly lower than would be expected with a narrower tire at higher pressure.


6PSI

2019 Dundas Soil and Crop Compaction Event

Exhibit: D5
New Holland T8.360 Dualled Row Crop Tractor w 480s


5
NEW HOLLAND
T8.360

Exh: D5

5,220
480/80R50

4,680

3,200
420/85R34

5,020

12 PSI Inside Tires

NH T8.360
34,820 lbs (15.8T)

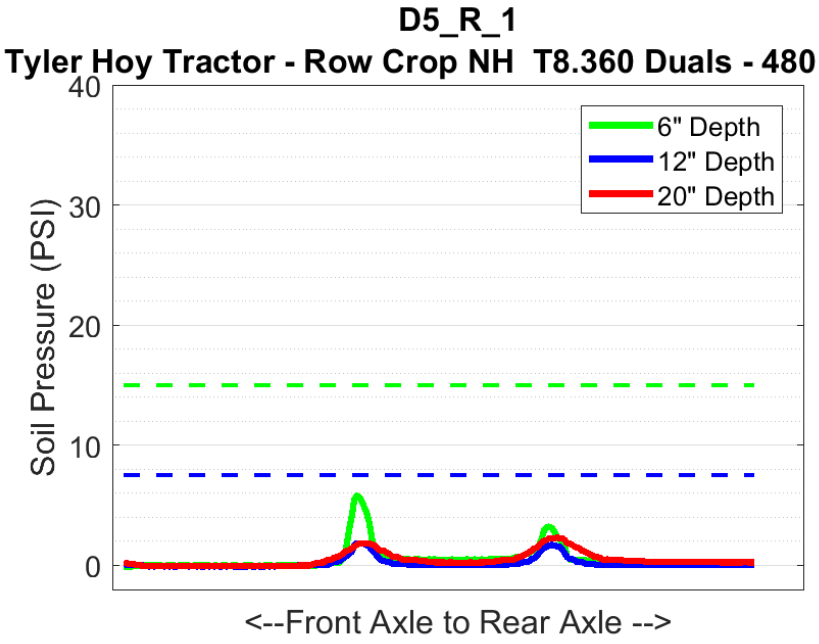
4,500

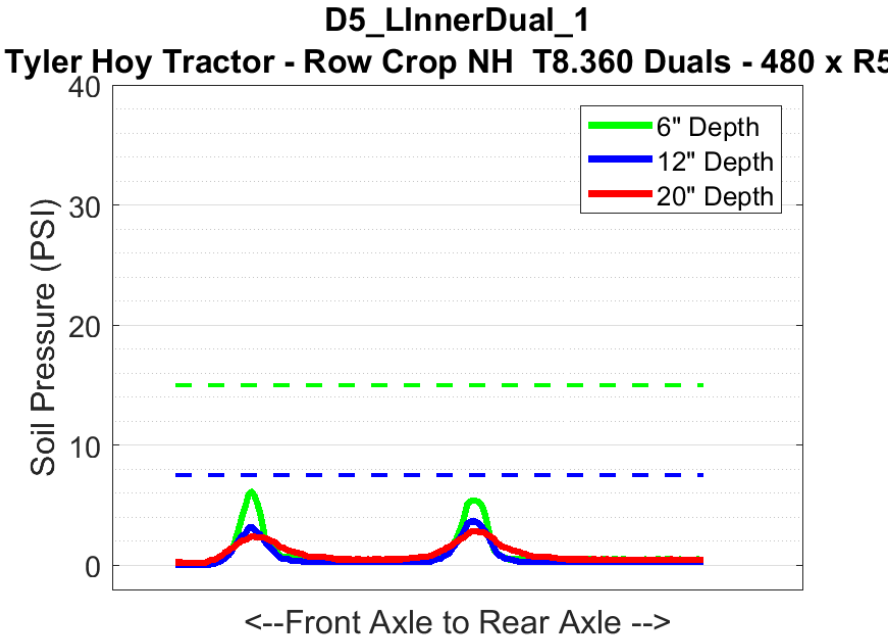
5,300
480/80R50

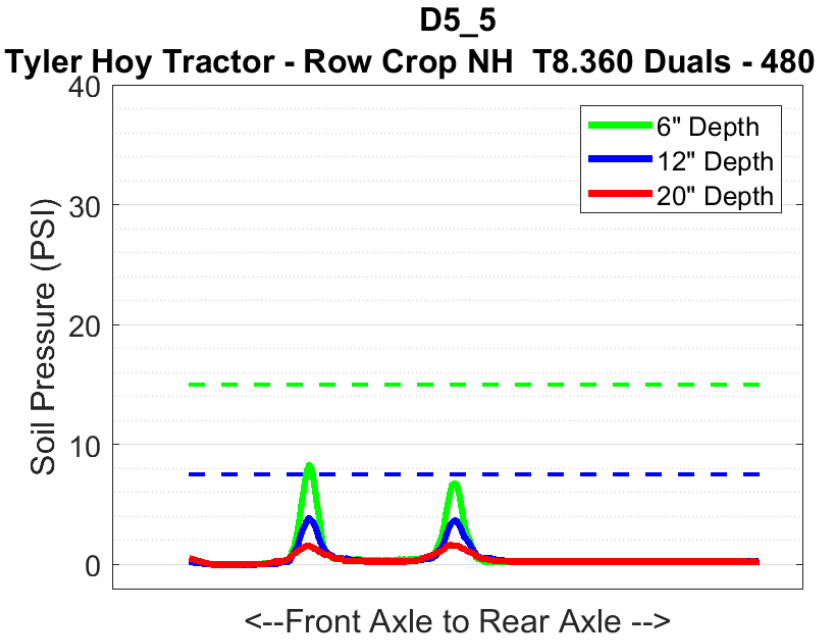
4,100

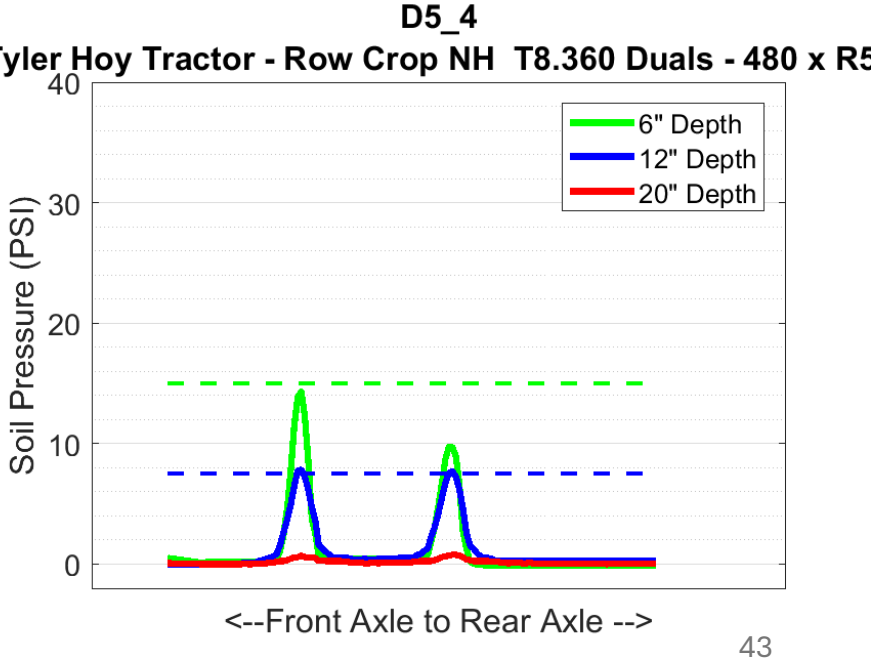
3,800
420/85R34

9 PSI Outside Tires


D5_R_1
Tyler Hoy Tractor - Row Crop NH T8.360 Duals - 480 x R5
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D5_LInnerDual_1
Tyler Hoy Tractor - Row Crop NH T8.360 Duals - 480 x R5
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D5_5
Tyler Hoy Tractor - Row Crop NH T8.360 Duals - 480 x R5
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D5_4
Tyler Hoy Tractor - Row Crop NH T8.360 Duals - 480 x R5
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D5

- Similar stress at depth compared to D4 with LSW,
- The higher pressure tires compared to D4 mean a higher stress at 6 inch depth.
- This was the stress under the outer dual. It would be expected that stress under the inner duals would be higher as they have higher pressure and would carry more of the weight. Our equipment cant accommodate inside duals, which is why outside was tested.
- The two top graphs are from Pit 1 and he bottom Pit 4+5. Note how different pits can show different responses or response levels.

2019 Dundas Soil and Crop Compaction Event

Exhibit: D6
New Holland T7.230 Big Singles Row Crop Tractor w 710s


6

Exh: D6

5,640
710/70R3
8

4,160
600/65R2
8

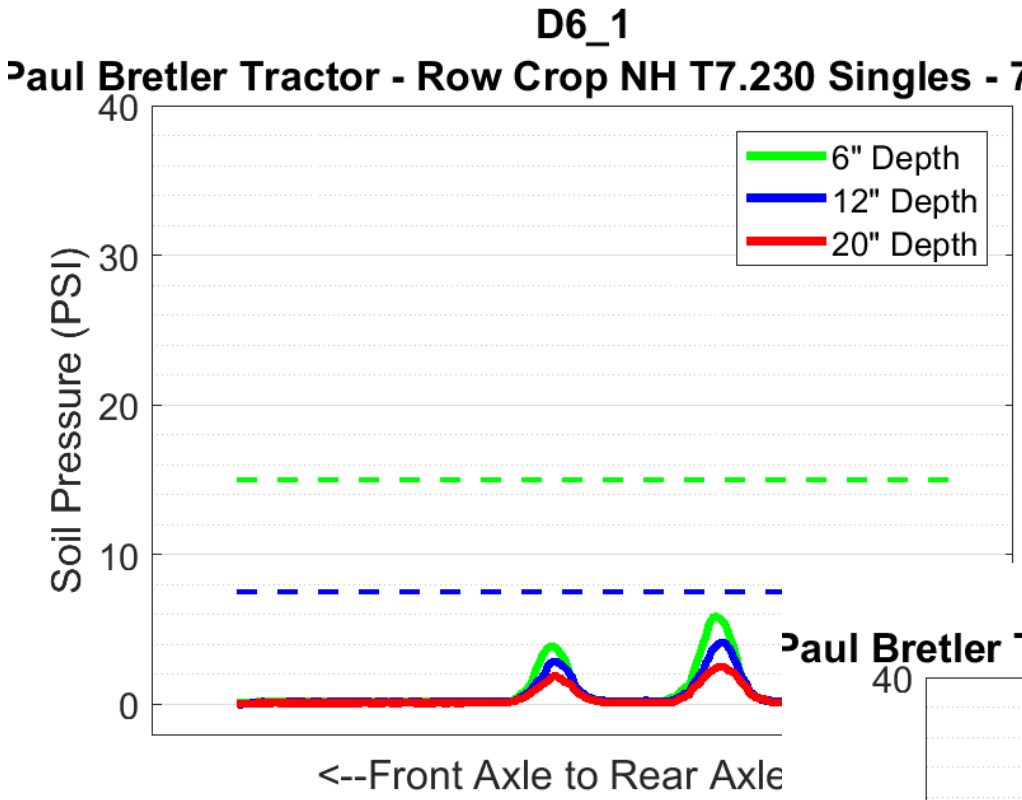
6 PSI
Fron
t
Tires

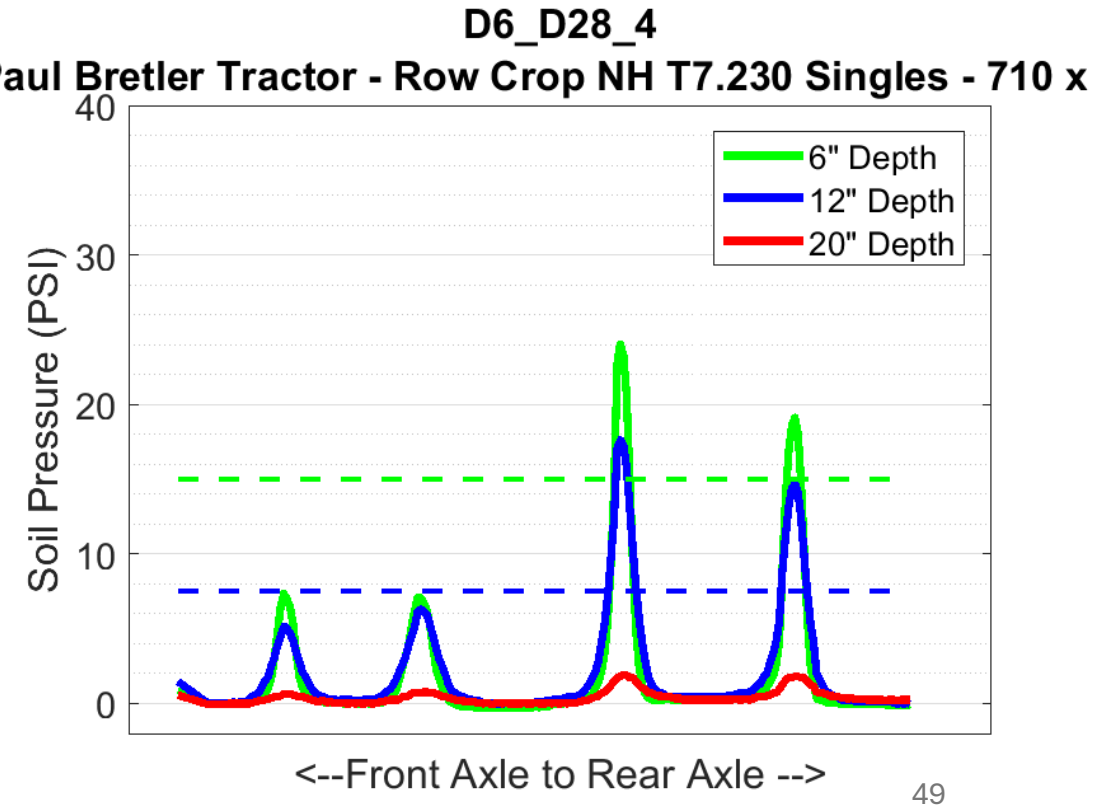
9 PSI
Rear
Tires

New Holland T7.230
19,700 lbs (9T)

5,820
710/70R38

4,080
600/65R2
8


D6_1
Paul Bretler Tractor - Row Crop NH T7.230 Singles - 710 x
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle


D6_D28_4
Paul Bretler Tractor - Row Crop NH T7.230 Singles - 710 x
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D6

- This is a lighter tractor than the others tested. Slightly lower stress even with narrower tires.
- D6_D28_4 only the left two peaks are the tractor.
- The _4 sensor location had significantly more moisture in the top 12 inches with would explain the higher stresses in the top two sensors at this location.
- This speaks to the variability of soil even in close proximity that makes the responses from individual exhibits problematic in interpretation.


EW HOLLAND

2019 Dundas Soil and Crop Compaction Event

Exhibit: D7
New Holland T7.260 Dualled Rear Row Crop Tractor w 480s


7

Exh: D7

2,720
480/80R46

3,740
480/80R46

4,400
380/85R34

New Holand T7.260
21,460 lbs (9.7T)

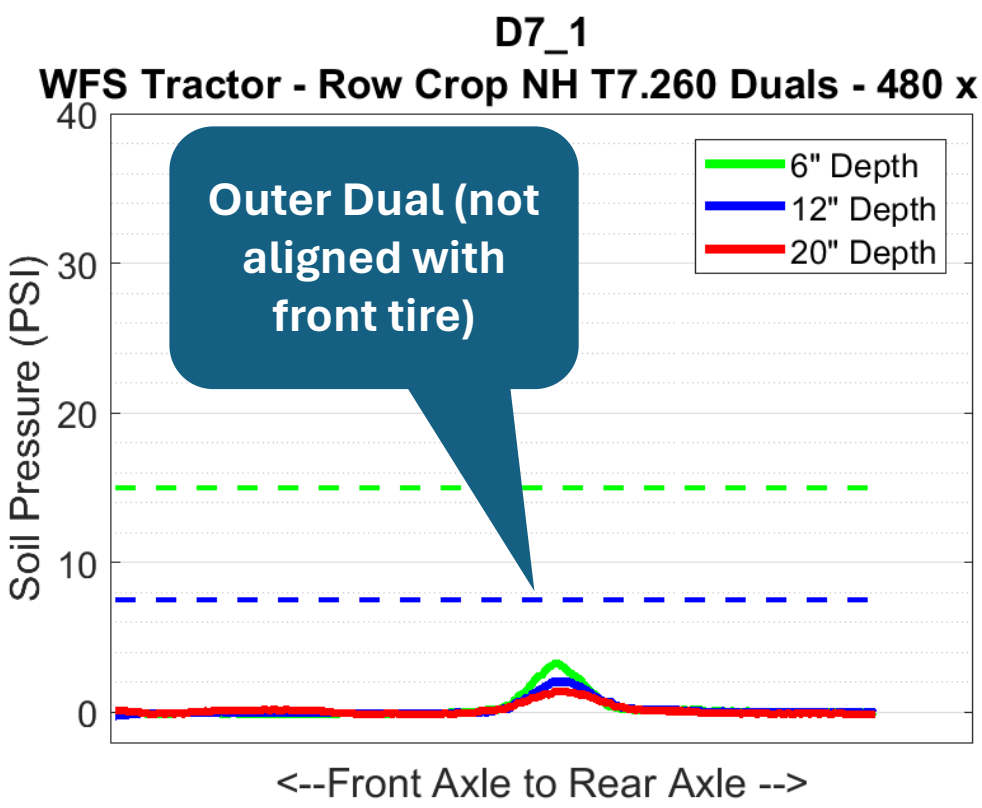
3,300
480/80R46

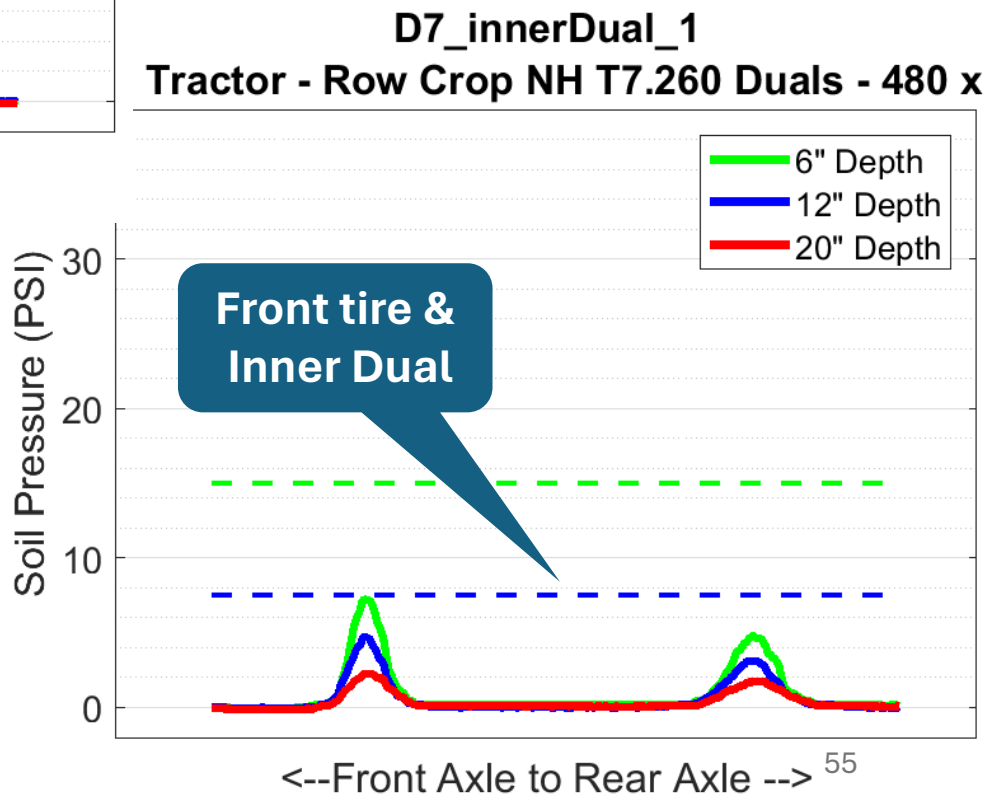
2,900
480/80R46

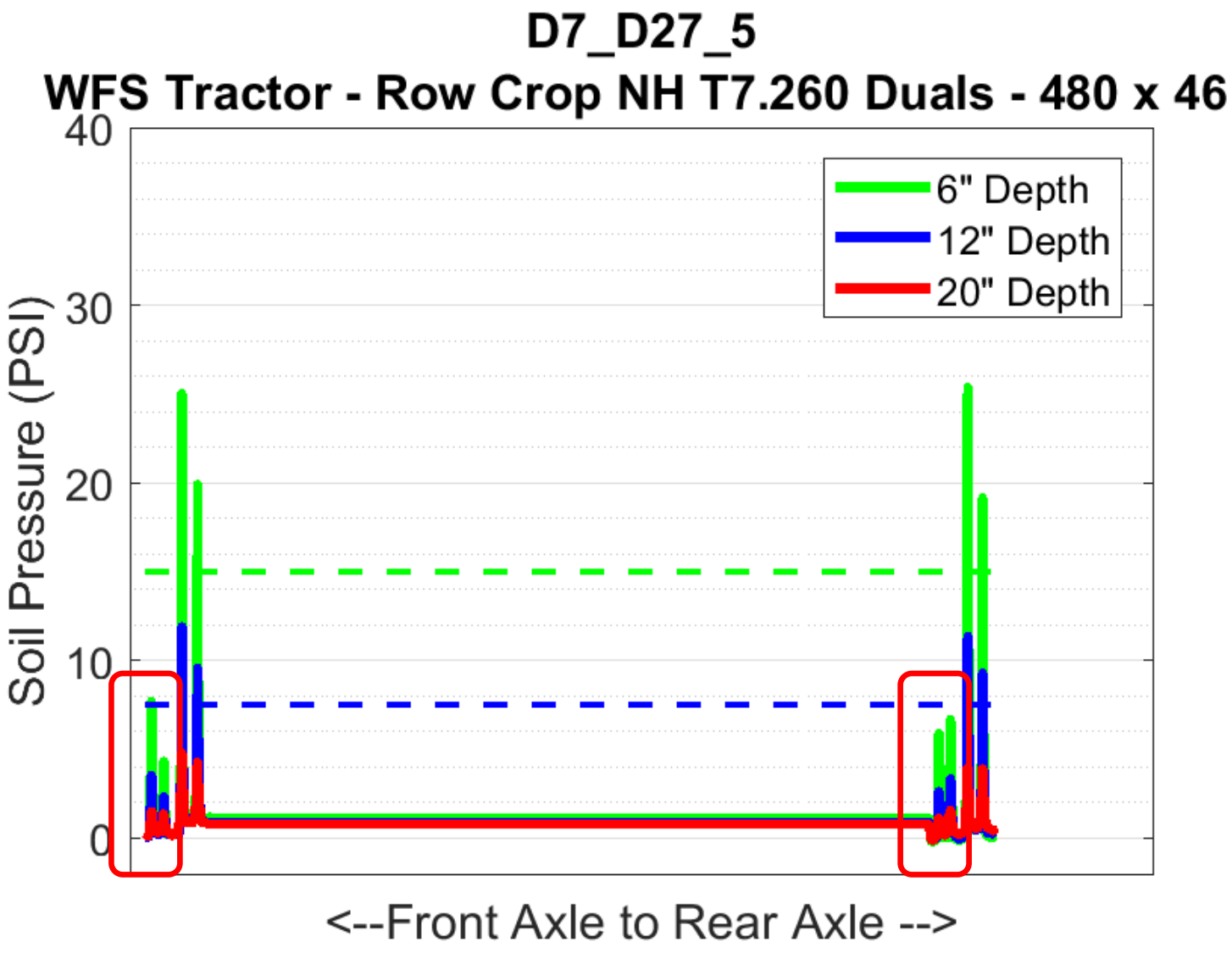
4,400
380/85R34

17 PSI front Tires

6/9 PSI outer/inner rear Tires


D7_1
WFS Tractor - Row Crop NH T7.260 Duals - 480 x
Outer Dual (not aligned with front tire)
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D7_innerDual_1
Tractor - Row Crop NH T7.260 Duals - 480 x
Front tire & Inner Dual
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
30
20
10
0
<--Front Axle to Rear Axle -->


D7_D27_5
WFS Tractor - Row Crop NH T7.260 Duals - 480 x 46
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D7

- The first plot D7_1 is the outer rear dual. This tire would not be carrying an equal load as the inside dual is at a higher PSI.
- The inner dual show a higher stress under the front tire which would be expected due to the much higher tire pressure.
- In the 3rd graph the tractor tires are enclosed in the red boxes. The other response curves are from Exh: 27, a gravity wagon.
- The tractors soil stress is much lower at all depths than the Gravity Wagon (see Exh: D27).




2019 Dundas Soil and Crop Compaction Event

Exhibit: D8
New Holland TS 115A Singled Row Crop Tractor w 380s


8
2

Exh: D8

3,500
380/90R46

2,400
11.00-16

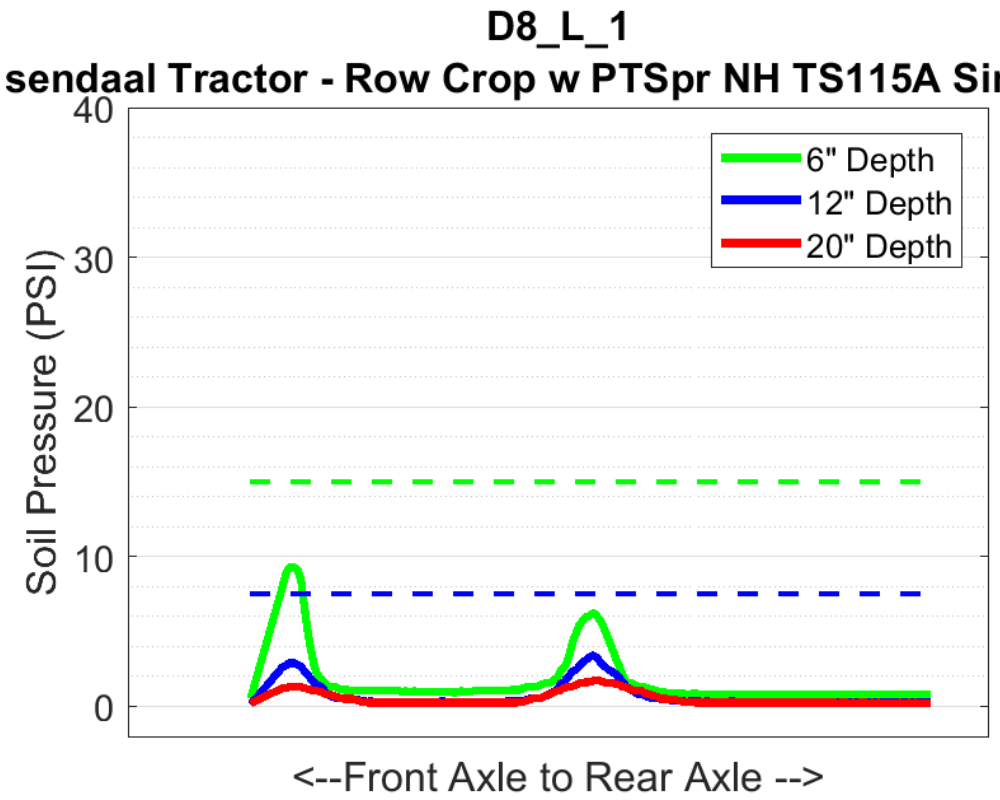
New Holland TSll5A
12,080 lbs (5.5T)

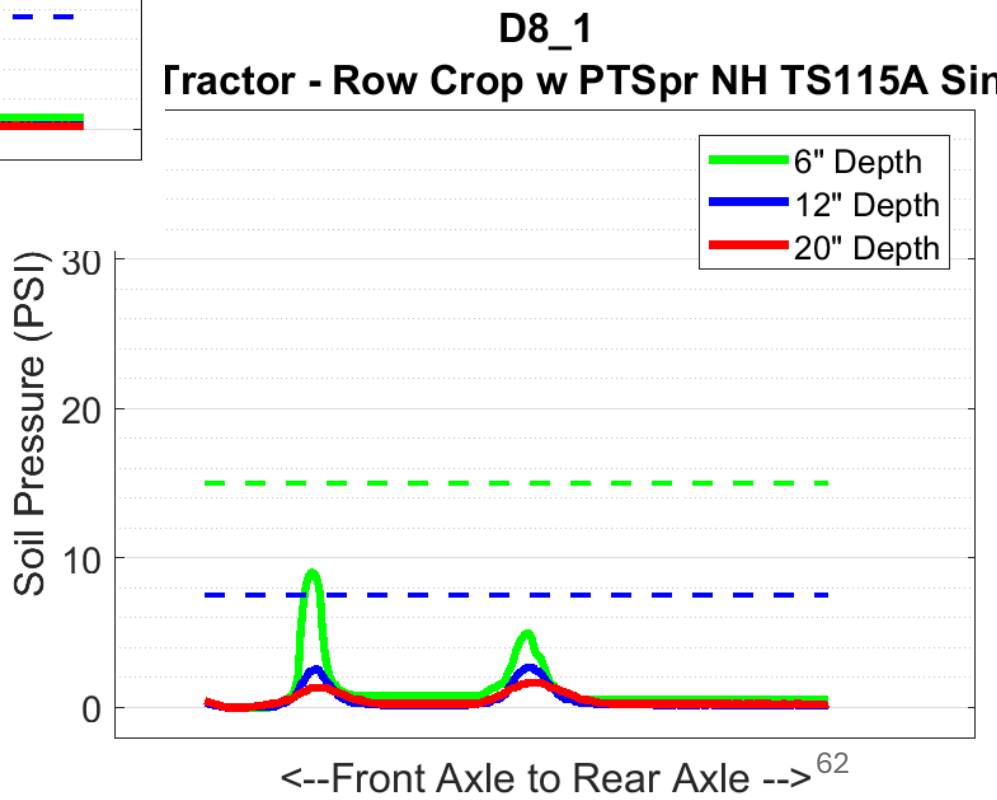
3,700
380/90R46

17 PSI

2,480
11.00-16

25 PSI


D8_L_1
sendaal Tractor - Row Crop w PTSpr NH TS115A Sin
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D8_1
Tractor - Row Crop w PTSpr NH TS115A Sin
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D8

- This is a much light tractor but has significantly high tire pressures and narrow widths
- The front tires are Bias and have a round contact profile.
- The higher stress at 6 inches is an effect of the high tire pressure.
- Lower stress at depth compared to other heavier tractors is due to the much lower overall weight.


NewHolland
TS115
Plus


NewHolland
TS115


NewHolland
TS115
Plus


TS115

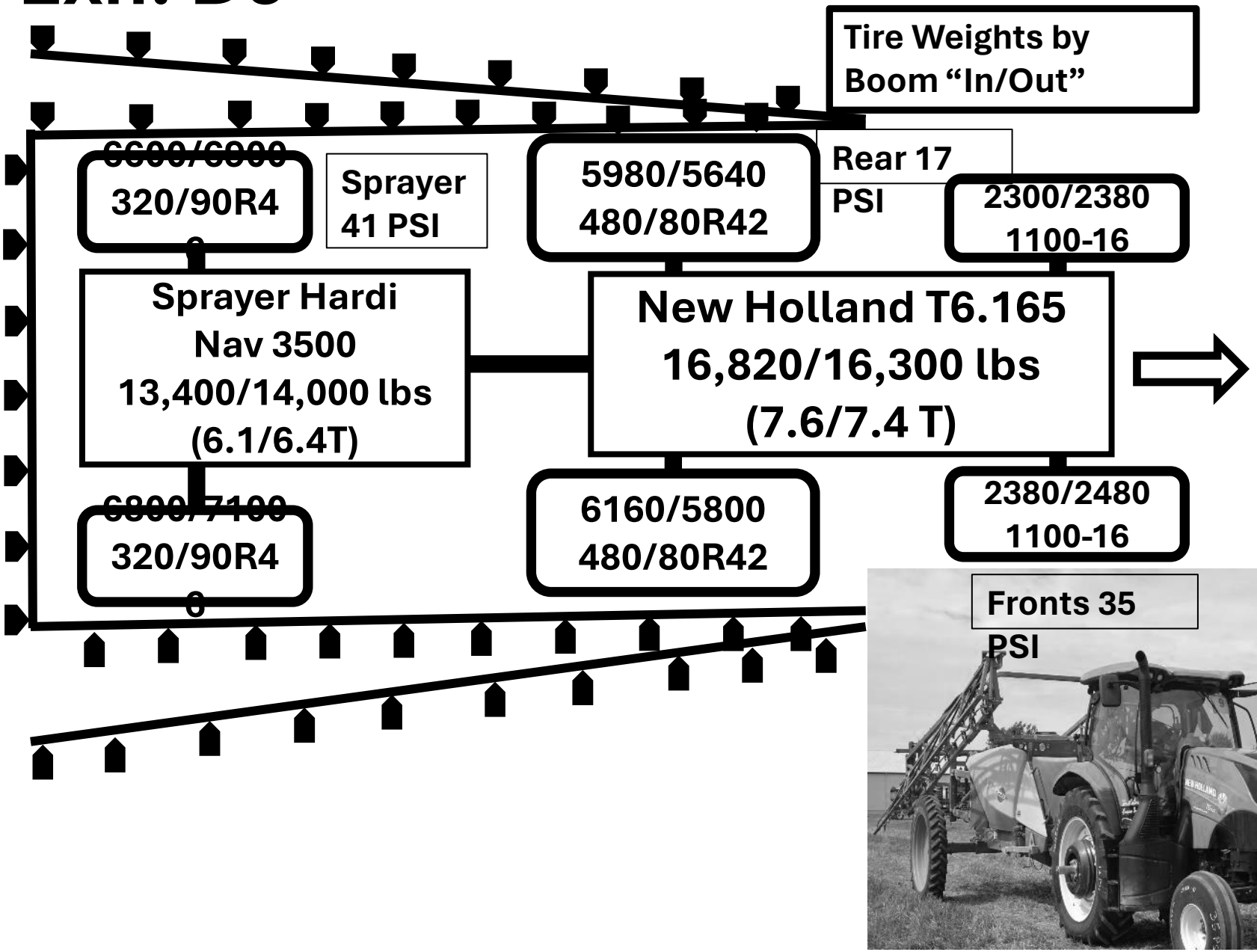
2019 Dundas Soil and Crop Compaction Event

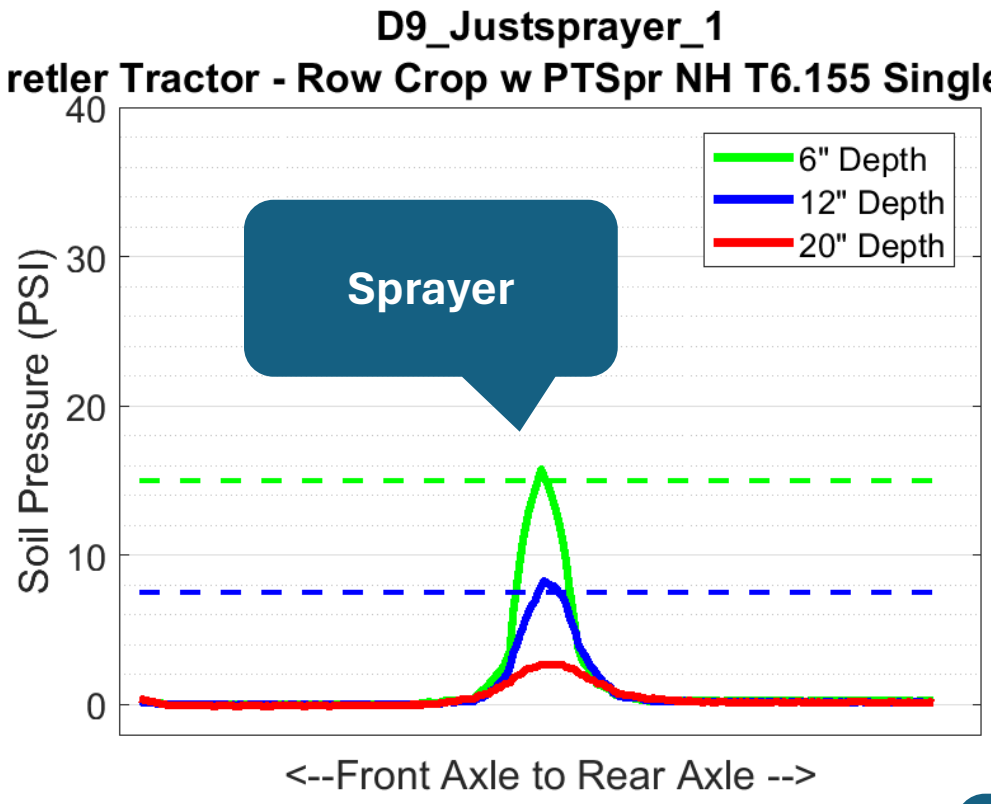
Exhibit: D9

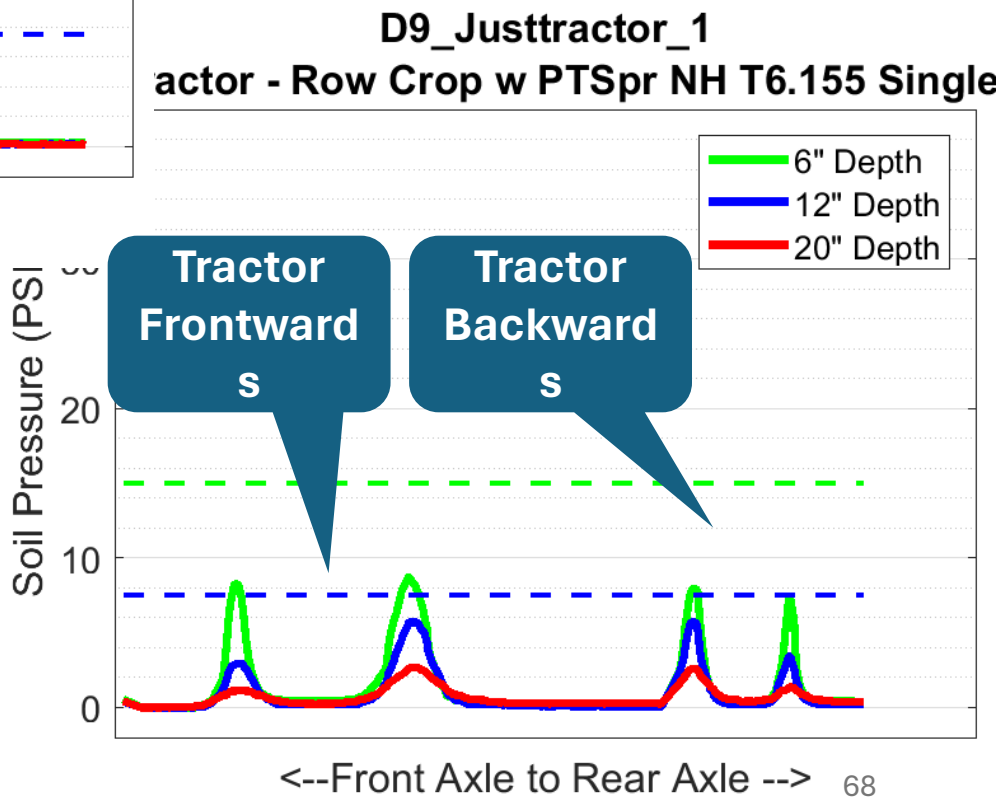
New Holland T6.165 Singled Row Crop Tractor w 480s + Hardi Navigator PT Sprayer w 320s


9

Exh: D9


Tire Weights by Boom "In/Out"
6600/6000
320/90R4
6
Sprayer 41 PSI
5980/5640
480/80R42
Rear 17 PSI
2300/2380
1100-16
Sprayer Hardi Nav 3500
13,400/14,000 lbs
(6.1/6.4T)
New Holland T6.165
16,820/16,300 lbs
(7.6/7.4 T)
6800/7100
320/90R4
6
6160/5800
480/80R42
2380/2480
1100-16
Fronts 35 PSI


D9_Justsprayer_1
retler Tractor - Row Crop w PTSpr NH T6.155 Single
6" Depth
12" Depth
20" Depth
Sprayer
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D9_Justtractor_1
actor - Row Crop w PTSpr NH T6.155 Single
6" Depth
12" Depth
20" Depth
Tractor Frontwards
Tractor Backwards
Soil Pressure (PSI
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D9

- Very narrow and high pressure tire on the sprayor combined with a heavy load means increase stress at all depths.
- The D9_justtractor_1 plot shows the tractor driving over the sensor and backing up over the sensor again to avoid the sprayor damaging the measurement equipment.
- The middle peaks on the plot are the rear tire of the tractor. The rear tire had more weight due to the tongue weight of the sprayer, increasing the stress at 12 inches.


NEW HOLLAND

2019 Dundas Soil and Crop Compaction Event

Exhibit: D10

Challenger MT 765D Wide vs Narrow Twin Tracked Row Crop Tractor

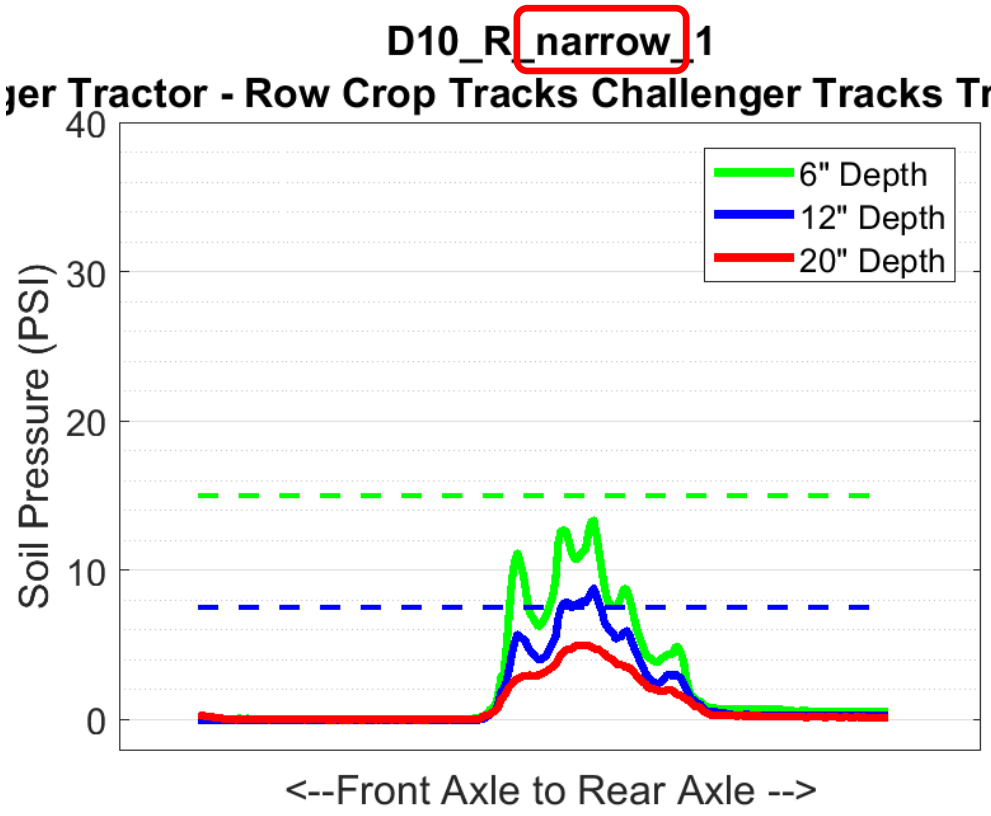

Challenger
MT765D
10
Wide (25”)
Narrow (18”)

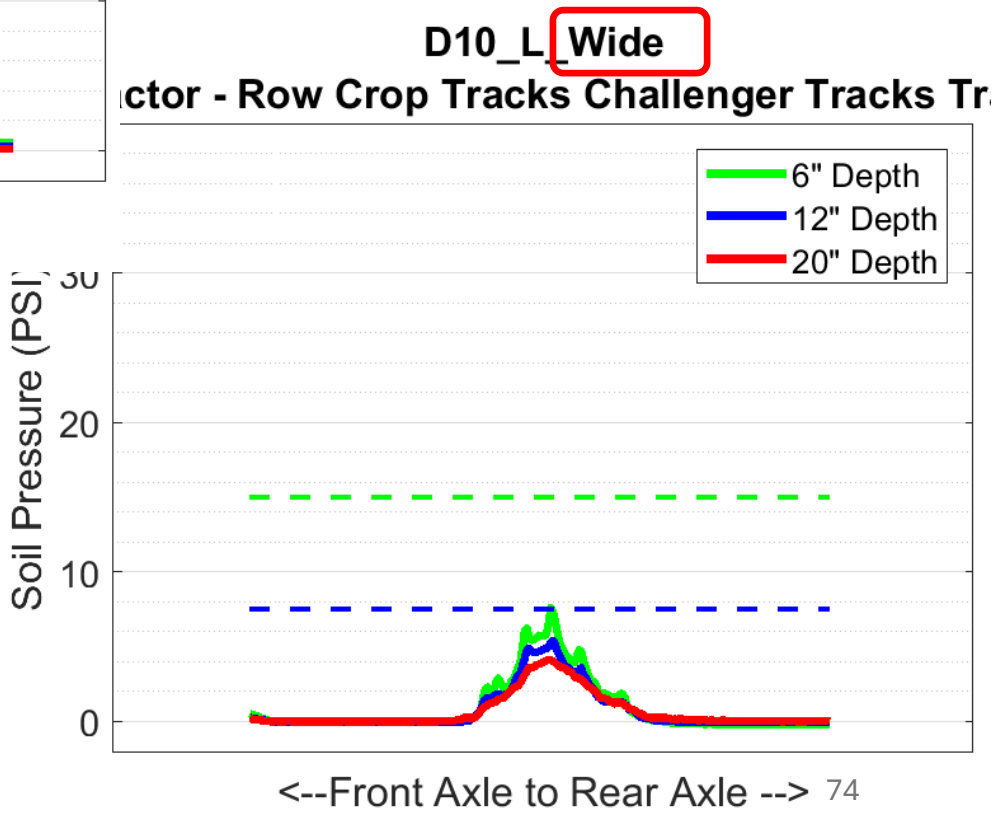
Exh: D10

17,120
97 X 25’’ Track

Challenger MT 765D
33,540 lbs (15.2 T)

16,420
97 X 18’’ Track


D10_R_narrow_1
ger Tractor - Row Crop Tracks Challenger Tracks Tr
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D10_L_Wide
ctor - Row Crop Tracks Challenger Tracks Tr
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D10

- The weight of this machine can be distributed over a wider track and reduce the stress at 6 and 12 inches.
- However, the stress at 20 inches was very similar for both the wide and narrow tracks since total weight is what drives compaction deeper and can only by offset by lightening the total load.


MT765D


MT765D


MT765D


MT765D

2019 Dundas Soil and Crop Compaction Event

Exhibit: D12

AGCO Gleaner S67 Dualled Combine w 18.4R42Fr/18.4R26Rr (460s)


12
SUPER SIX

Exh: D12

30 PSI

11,180
18.4R42

7,400
18.4R26

11,280
18.4R42

32 PSI

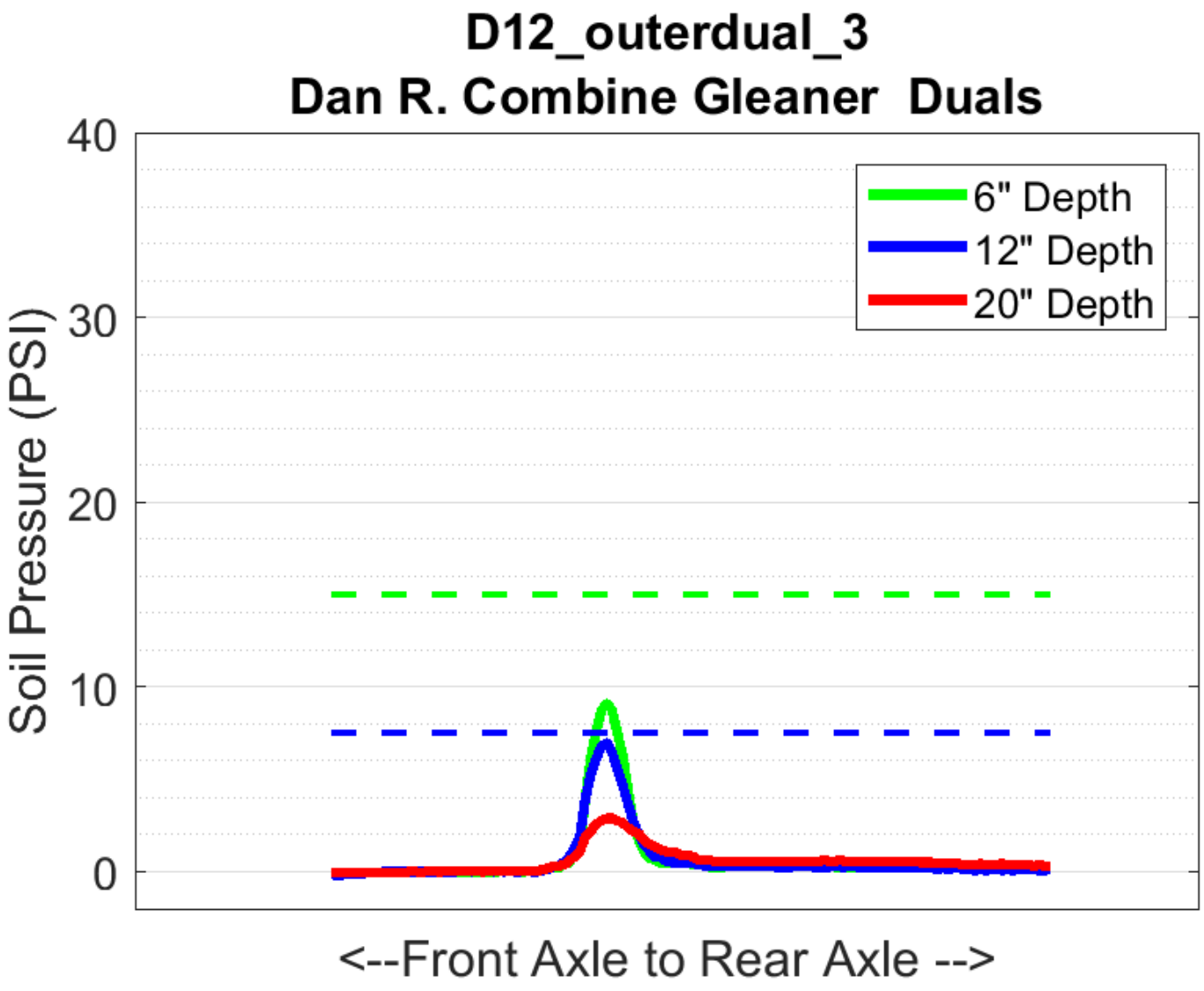
AGCO Gleaner S67
58,370 lbs (26.5 T)

6,900
18.4R26

11,150
18.4R42

10,460
18.4R42

18.4R42 = 460/85R42
18.4R26 = 420/85R26


D12_outerdual_3
Dan R. Combine Gleaner Duals
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D12

- This combine shows a similar trend to most combines
  - Heavy weight will tend to show more stress at depth
- Relatively narrow dual wheels at 30psi is on the poor end of a combine setup.


12
SUPER SIX

2019 Dundas Soil and Crop Compaction Event

Exhibit: D16
CaseIH 8250 Dualled Combine w 580s & 750 Rears


16

Exh: D16

41 PSI

14,380
IF580/85R42

8,700
VF750/65R26

14,120
IF580/85R42

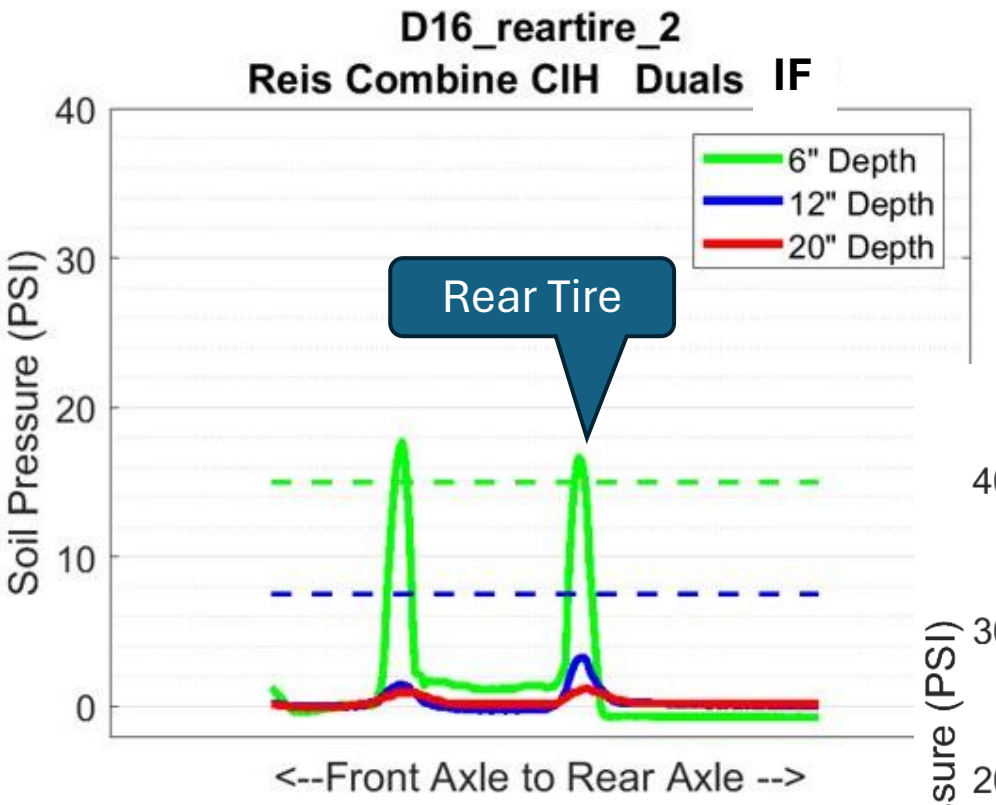
20 PSI

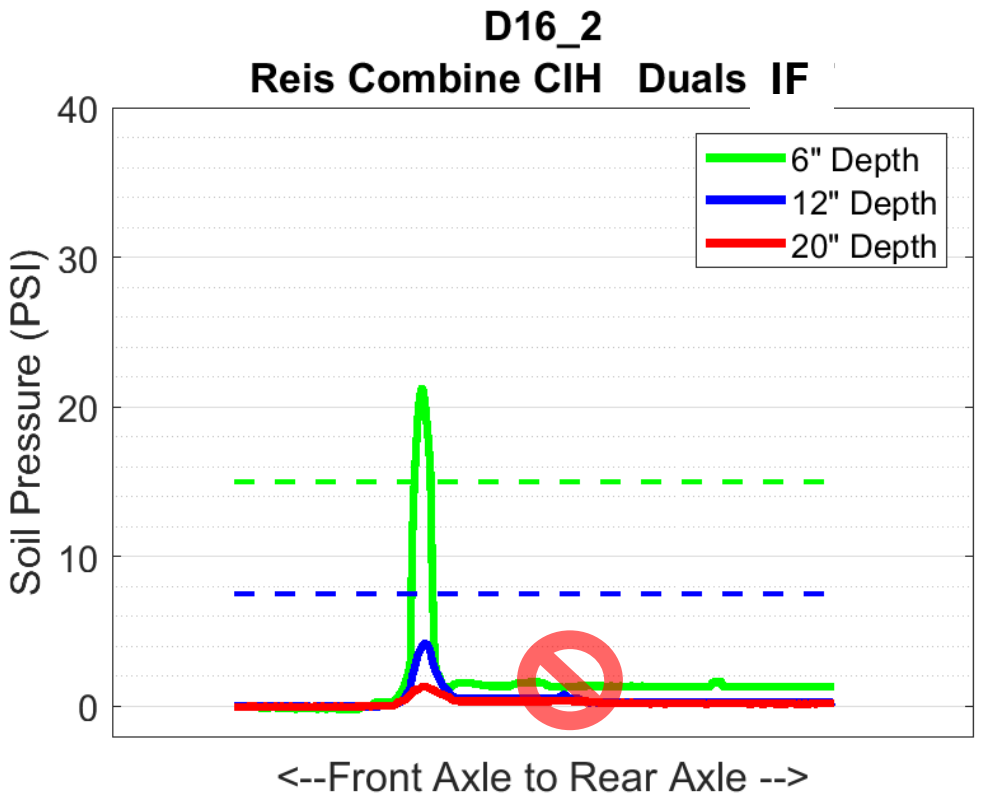
CaseIH 8250 Dualed
Combine
69,460 lbs (35 T)

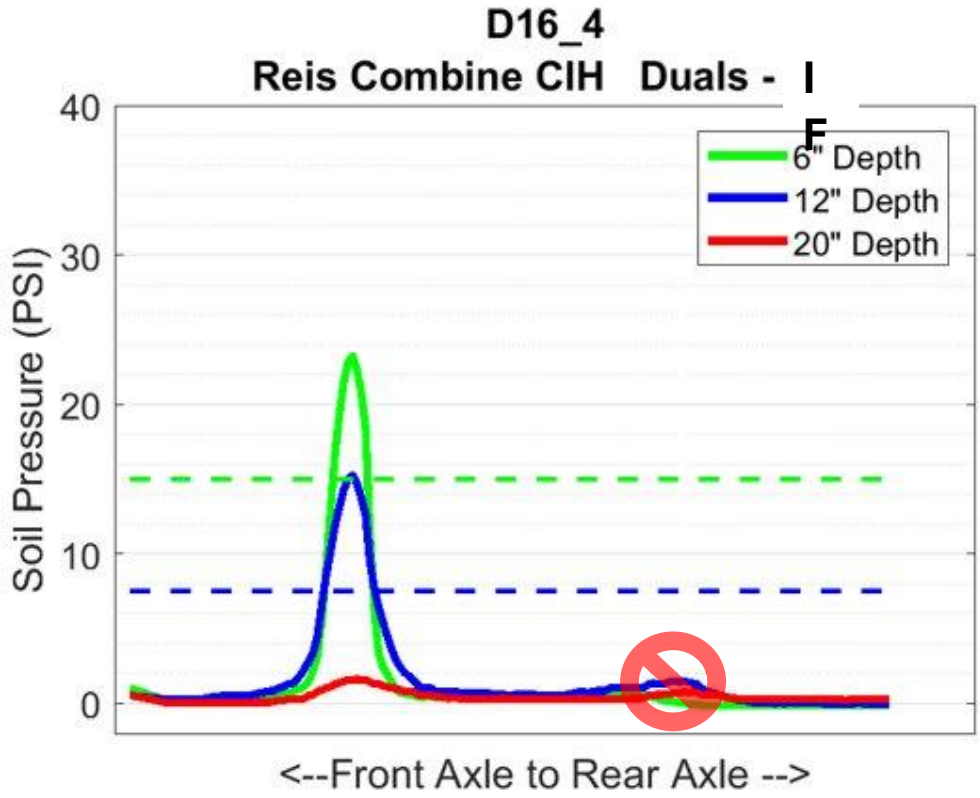
9,000
VF750/65R26

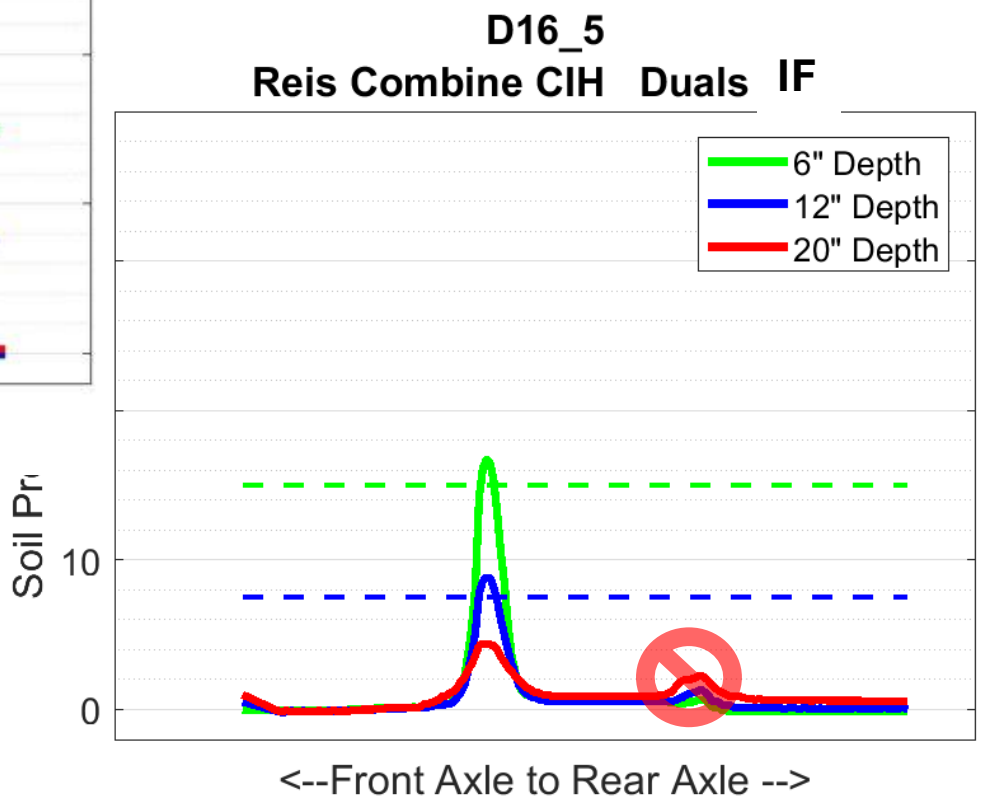
12,720
IF580/85R42

10,540
IF580/85R42


D16_reartire_2
Reis Combine CIH Duals IF
6" Depth
12" Depth
20" Depth
Rear Tire
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D16_2
Reis Combine CIH Duals IF
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D16_4
Reis Combine CIH Duals - I
F
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D16_5
Reis Combine CIH Duals IF
6" Depth
12" Depth
20" Depth
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D16

- This combine, although it was sporting IF dual radial tires, still had 41 PSI, where we should be targeting less that 20 and preferably less than 15 if not lower.
- This is seen in the plot with very high stress at the surface


8250
CASE IH
AXIAL-FLOW
12720 IN
41 PSI


41 PSI
14120
41 PSI
14350


20 PSI
8900

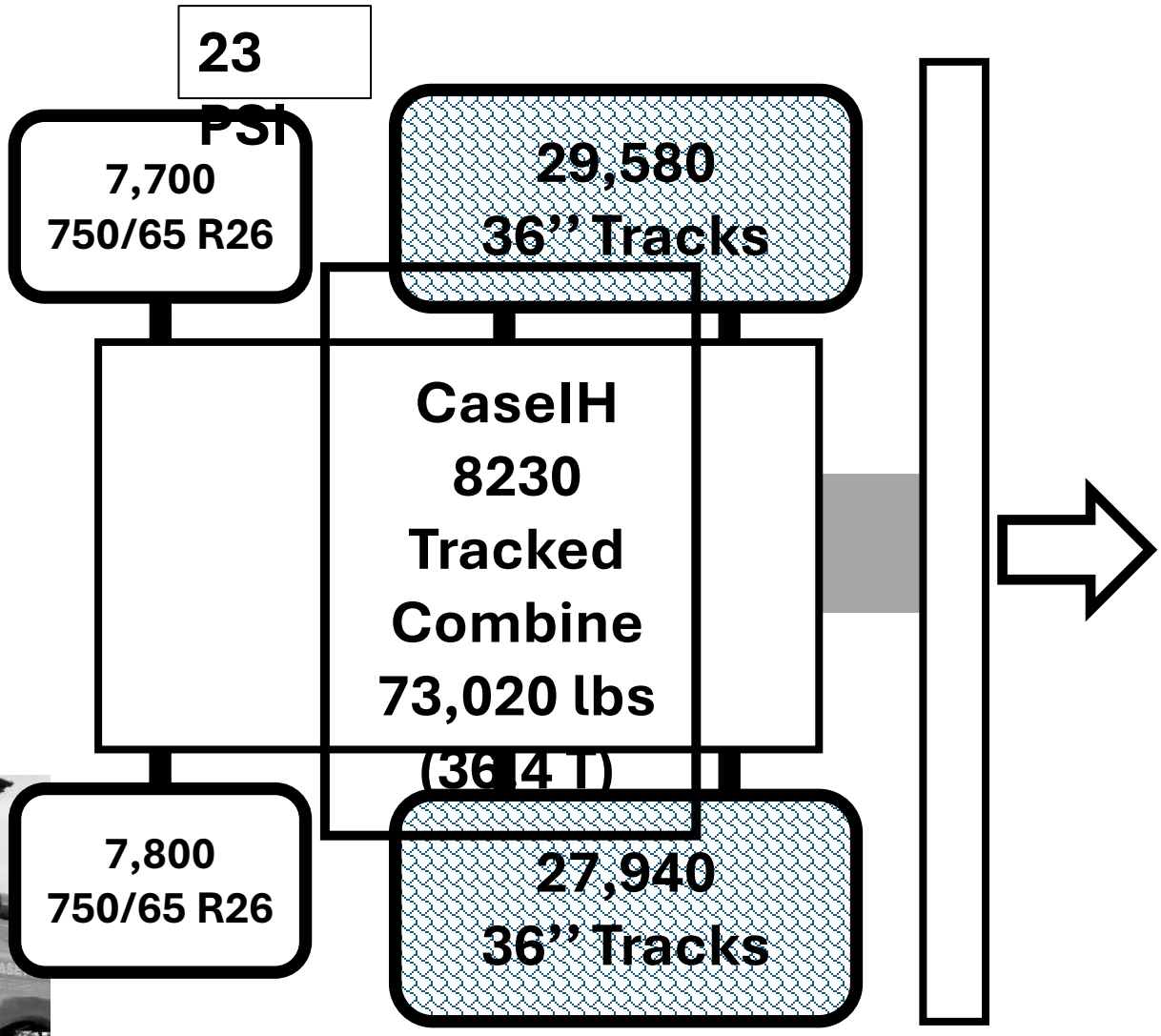
2019 Dundas Soil and Crop Compaction Event

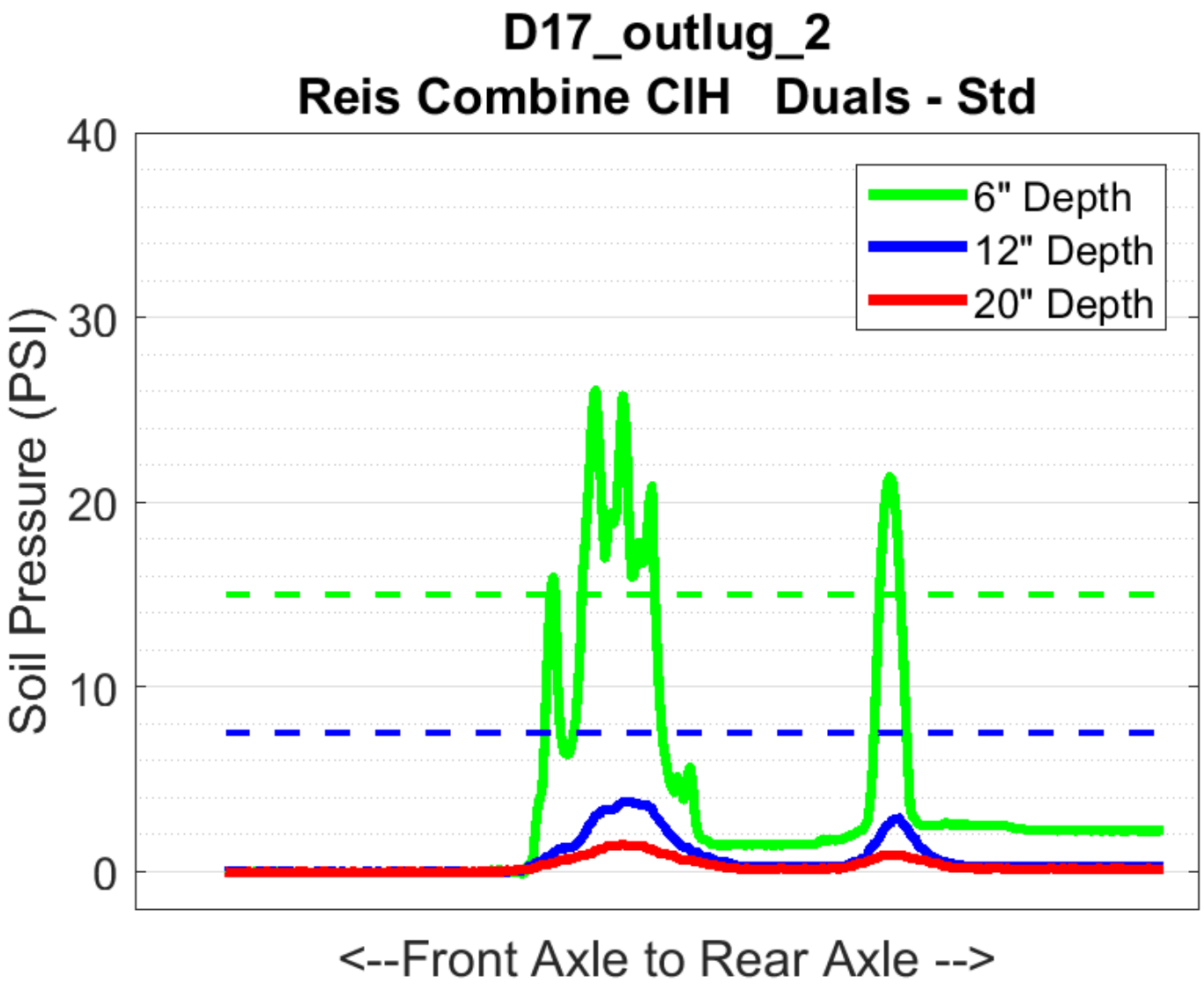
Exhibit: D17
CaseIH 8230 Tracked Combine w 750 Rears


17
CASE
AXIAL-FLOW

Exh: D17


CASE IH


23
PSI
7,700
750/65 R26
29,580
36'' Tracks
CaseIH
8230
Tracked
Combine
73,020 lbs
(36.4 T)
7,800
750/65 R26
27,940
36'' Tracks


D17_outlug_2
Reis Combine CIH Duals - Std
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D17

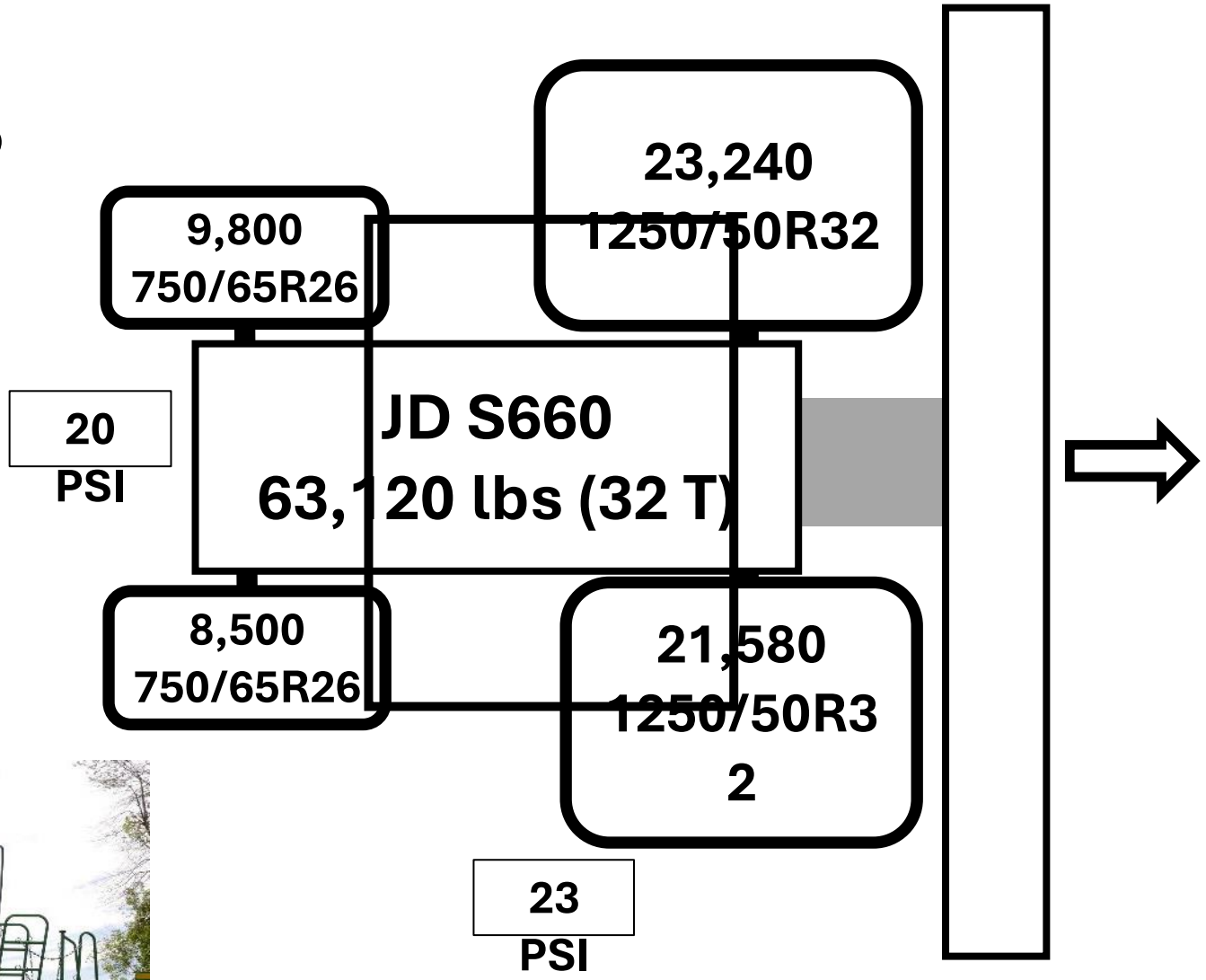
- This combine showed very high surface stress. Very similar to the D16 wheeled combine plot.
- Most of the weight is carried by the mid rollers of the track unit as shown by the green spikes in the graph.
- Note the impact of the rear steering tire as well.

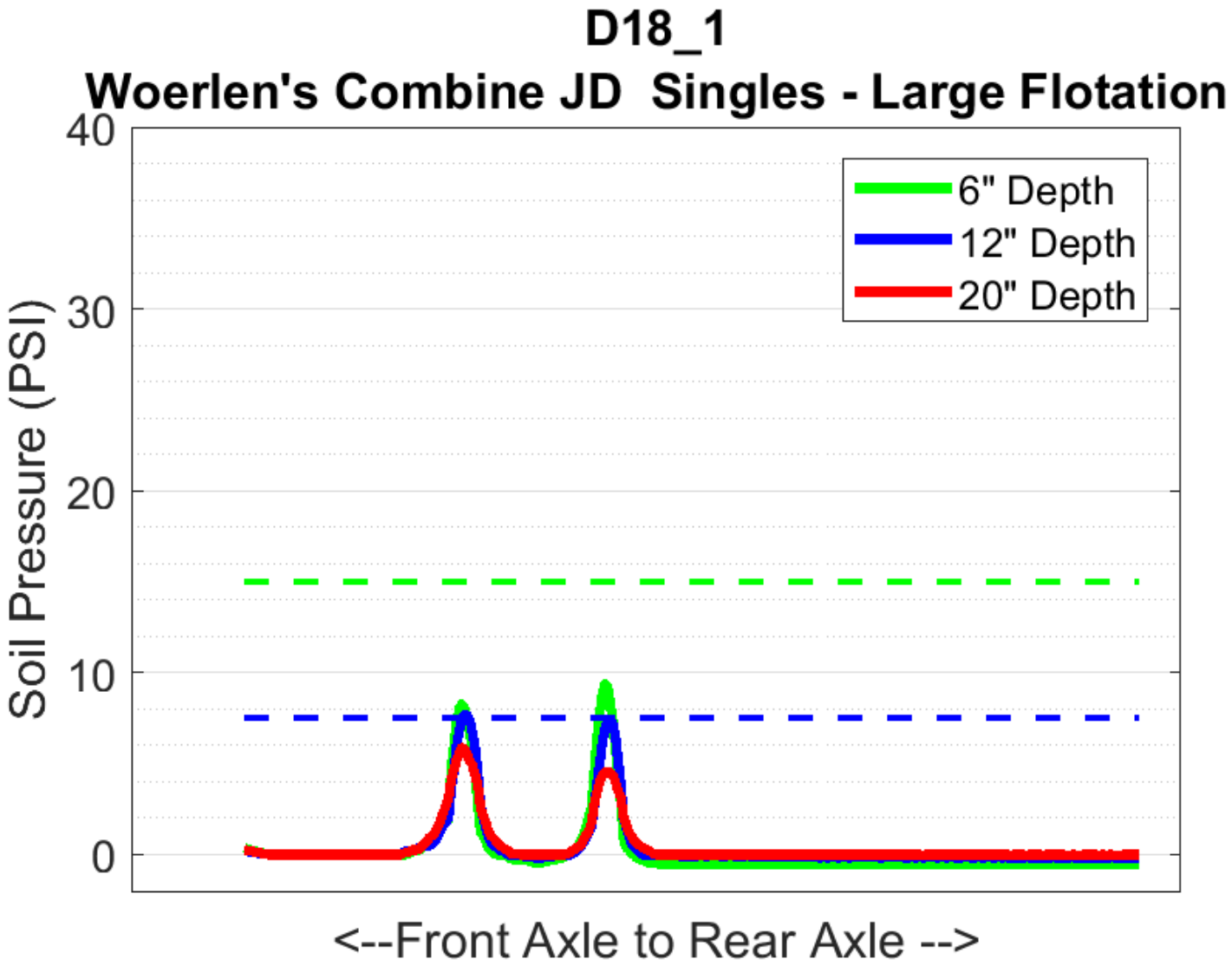
2019 Dundas Soil and Crop Compaction Event

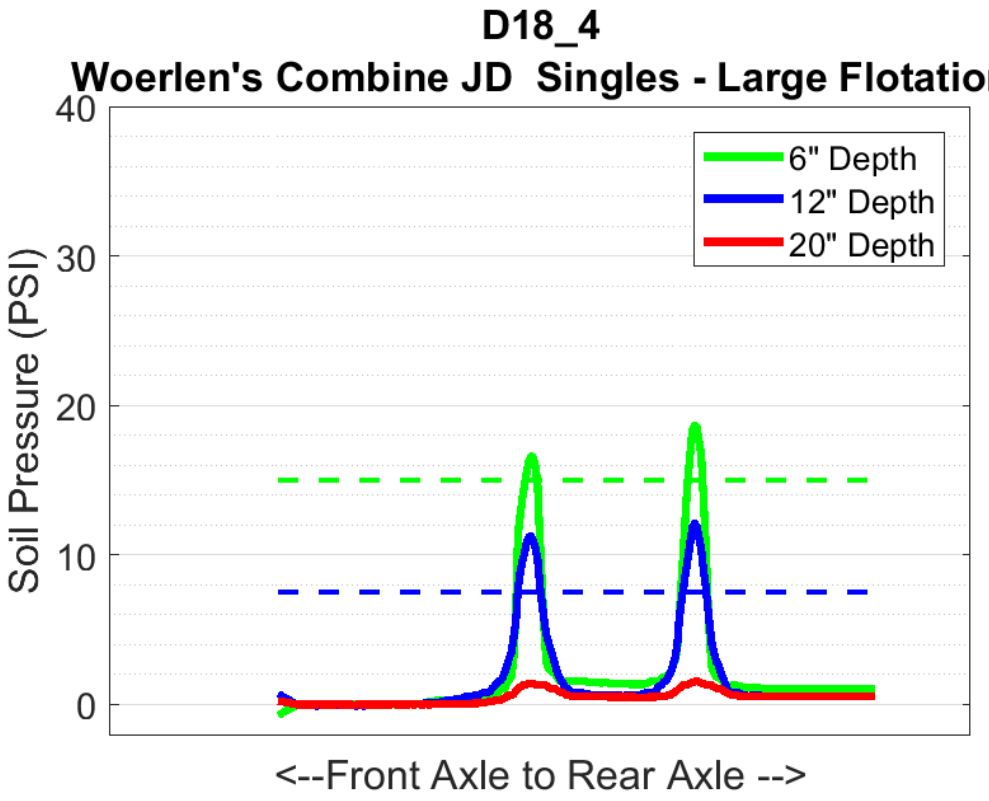
Exhibit: D18
JD S660 Big Singles 1250s Combine w 750 Rears

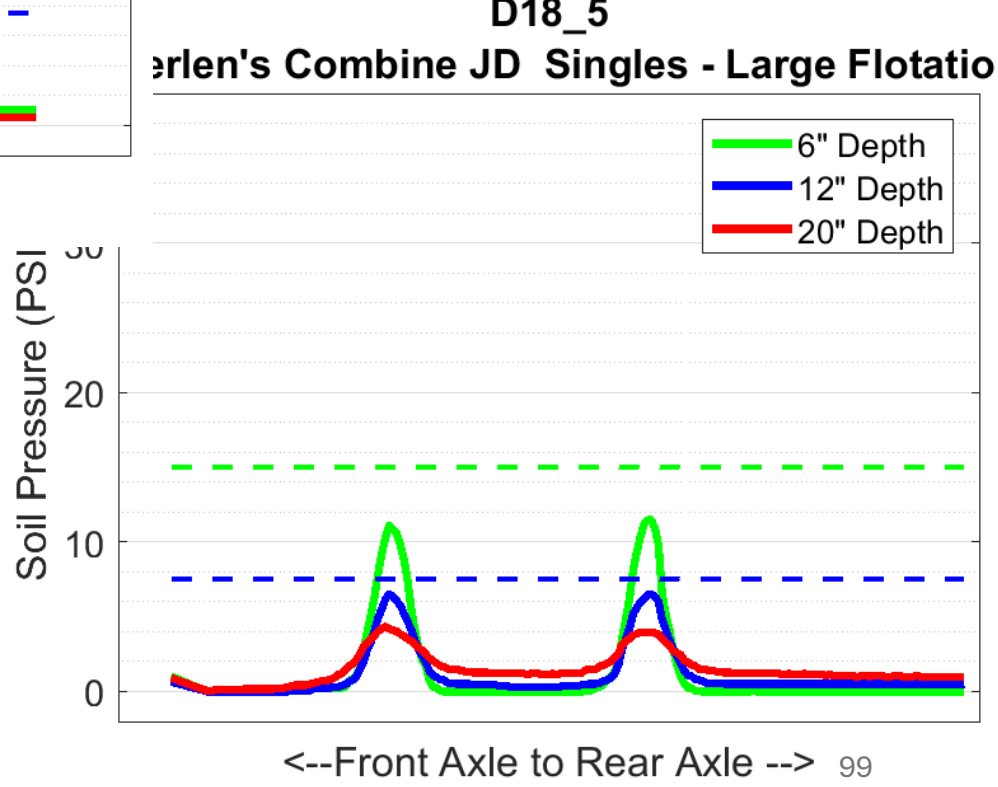

18
JOHN DEERE

Exh: D18


9,800
750/65R26
23,240
1250/50R32
20
PSI
JD S660
63,120 lbs (32 T)
8,500
750/65R26
21,580
1250/50R32
23
PSI


D18_1
Woerlen's Combine JD Singles - Large Flotation
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D18_4
Woerlen's Combine JD Singles - Large Flotatio
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D18_5
erlen's Combine JD Singles - Large Flotatio
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D18

- Large tires at a moderate pressure again show lower stress in the upper soil but note the Blue and Red curves near the dotted blue line, this is cause for concern.
- Heavy weight is apparent with the stress at 20 inch depth for Pit 1 and 5. Different from Pit 4 and reinforces the issue about changes in soil and moisture between pits in the same field.


JOHN DEERE

2019 Dundas Soil and Crop Compaction Event

Exhibit: D19
Class 870 SP Forage Harvester
w 1050 Fronts w CTIS and 540 Rears


JAGUAR
19
CLAAS
JAGUAR
870
40

Exh: D19

15 PSI

3,940
540/65R26

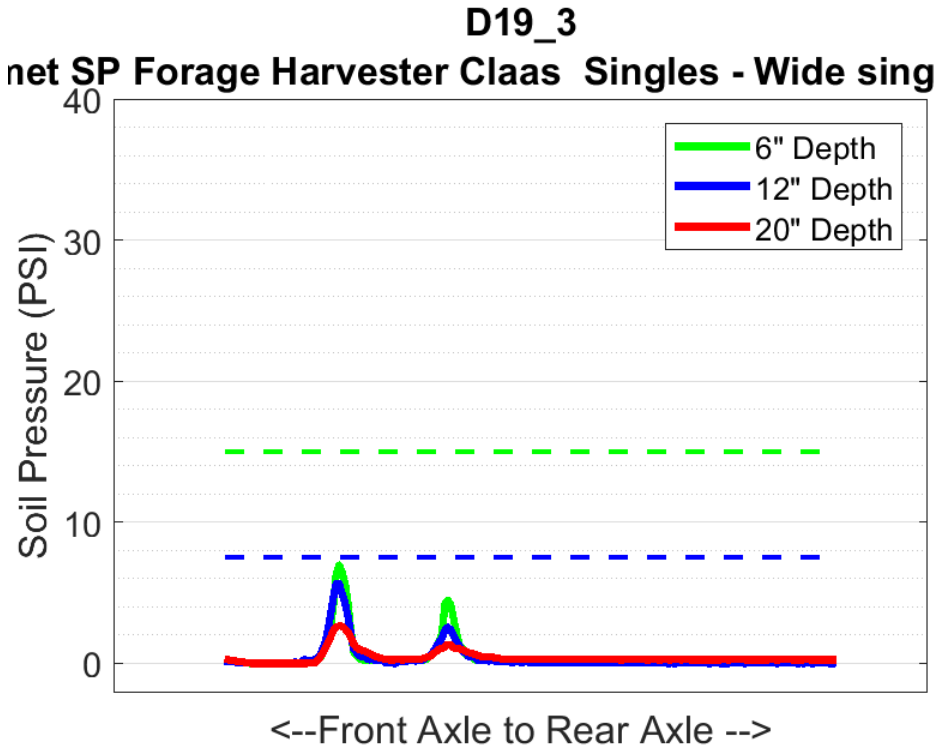
12,880
1050/50R32
41/25 PSI

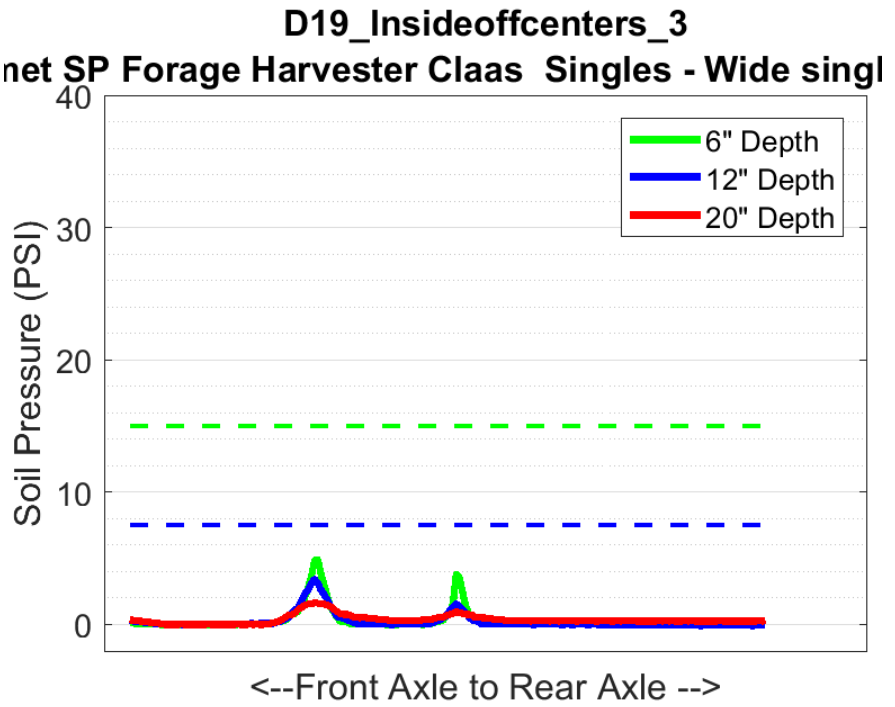
CLAAS Jaguar 870
SP Forage Harvester
33,530 lbs (16.7 T)

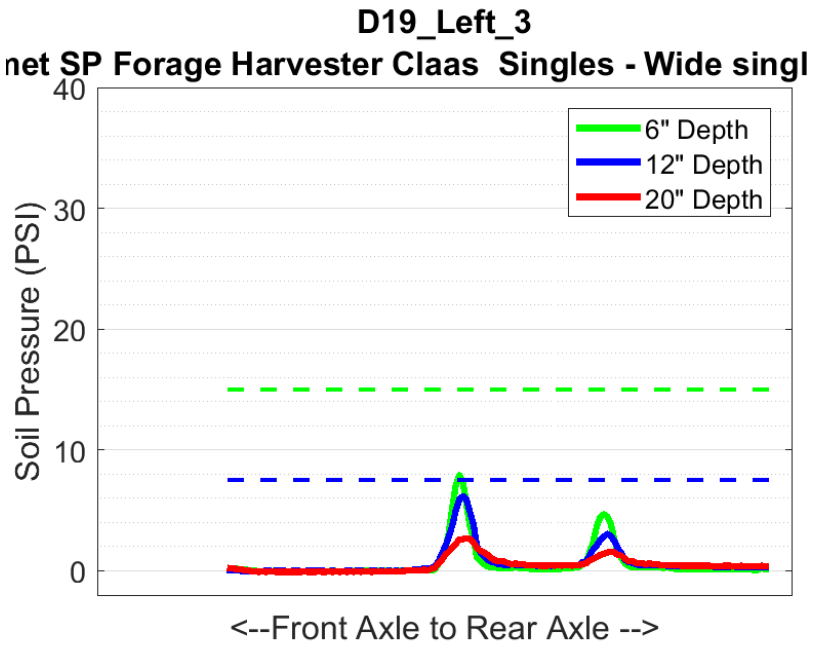
3,880
540/65R26

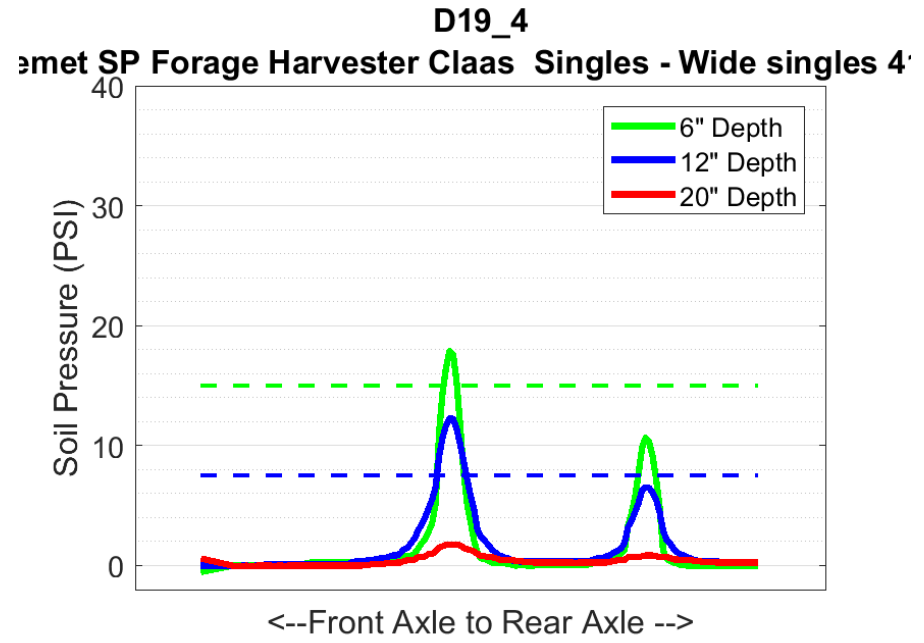
12,830
1050/50R3
2
41/25 PSI

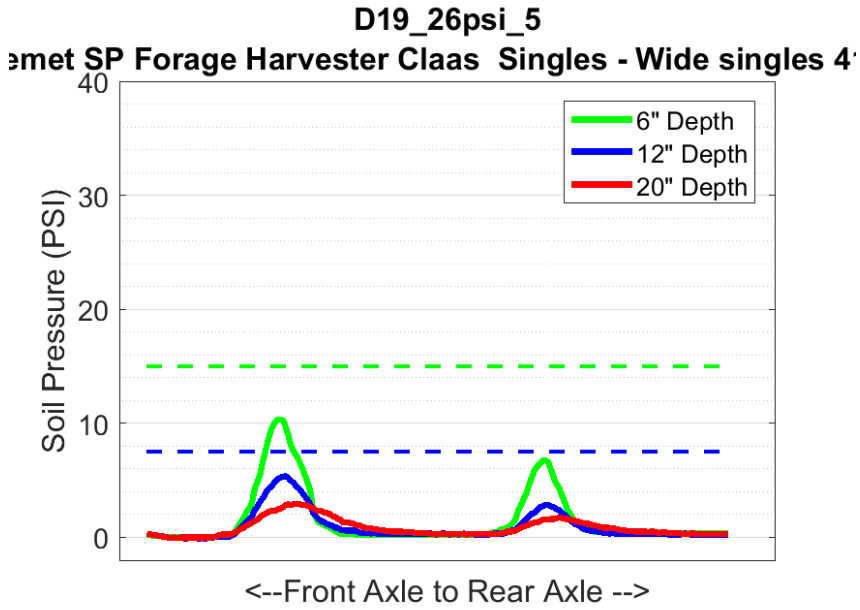
Owner operates at 25 but tire rec is 41 psi

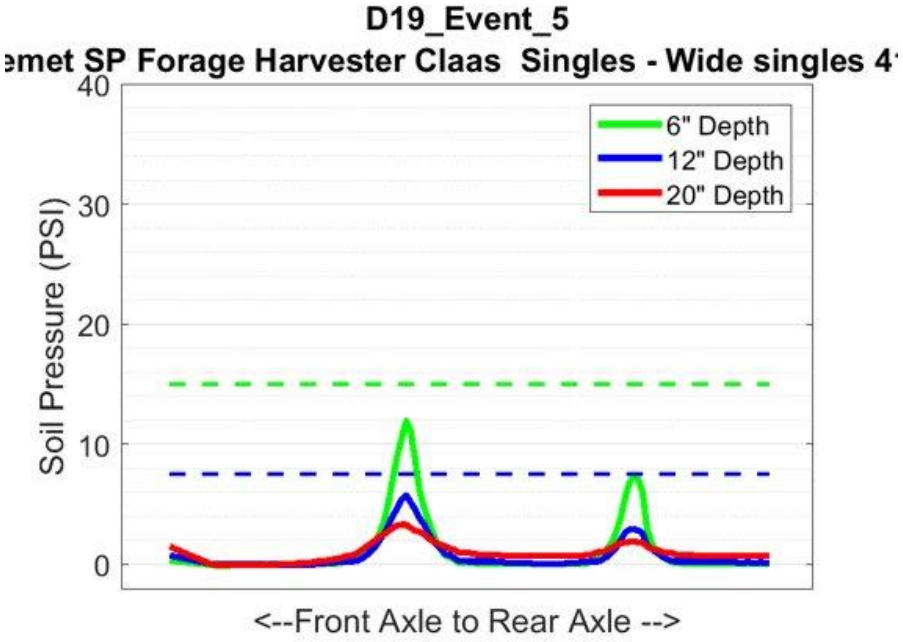

D19_3
net SP Forage Harvester Claas Singles - Wide singl
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

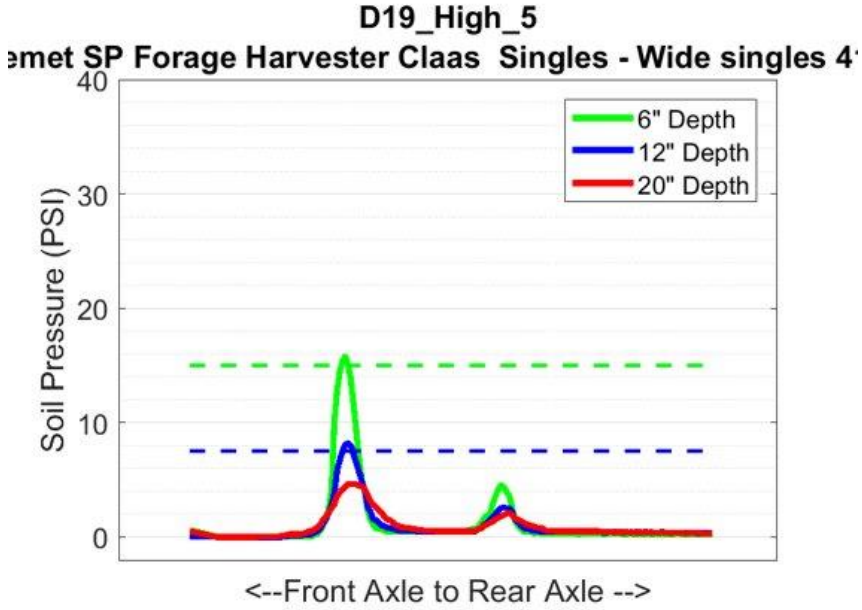

D19_Insideoffcenters_3
net SP Forage Harvester Claas Singles - Wide singl
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D19_Left_3
net SP Forage Harvester Claas Singles - Wide singl
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D19_4
emet SP Forage Harvester Claas Singles - Wide singles 4
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D19_26psi_5
emet SP Forage Harvester Claas Singles - Wide singles 4
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D19_Event_5
emet SP Forage Harvester Claas Singles - Wide singles 4
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D19_High_5
emet SP Forage Harvester Claas Singles - Wide singles 4
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

Plot Comments – D19

- These plots show the benefit of a CTIS system installed on a forage harvester
- The harvester has a heavy front axle load and the high pressure tires can be lowered in the field to reduce the stress in the topsoil

2019 Dundas Soil and Crop Compaction Event

Exhibit: D20
New Holland C232
Tracked Skid Steer Loader


20
W1+2
NEW HOLLAND
EW HOLLAND

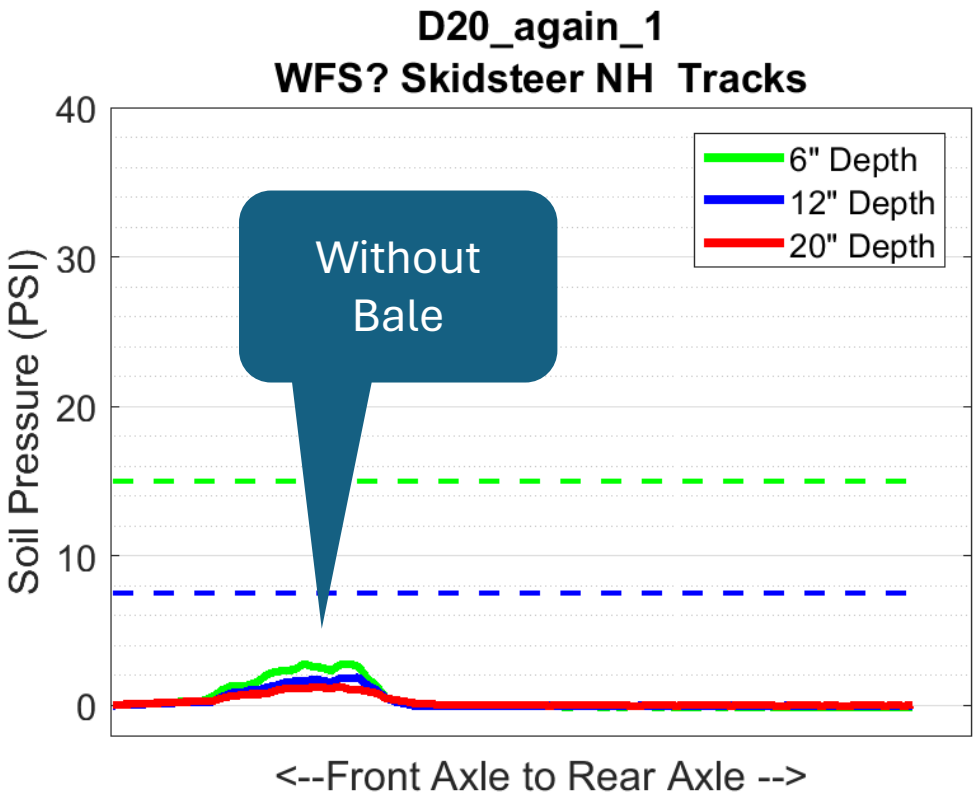
Exh: D20

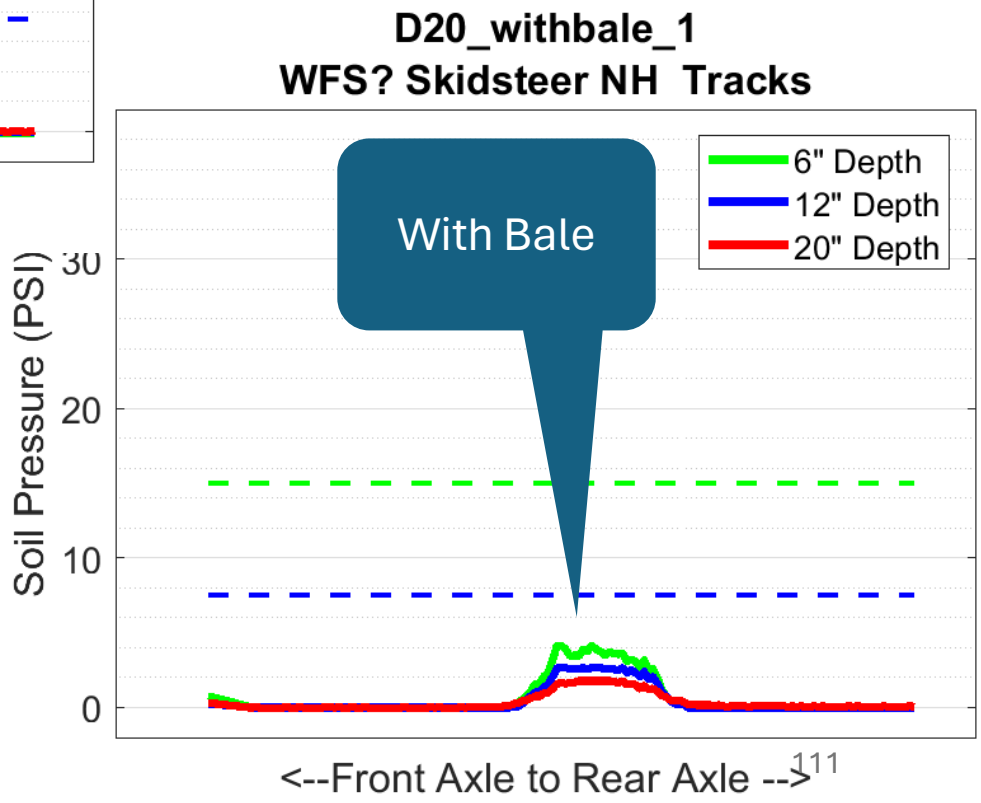
Weight: Loaded with bale/Unloaded

5,060/4,680
65 X 18’’ Tracks

New Holland Skidsteer
232
10220/8500 lbs
(4.6/3.8T)

5,160/3,820
65 X 18’’ Tracks


D20_again_1
WFS? Skidsteer NH Tracks
6" Depth
12" Depth
20" Depth
Without Bale
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D20_withbale_1
WFS? Skidsteer NH Tracks
6" Depth
12" Depth
20" Depth
With Bale
Soil Pressure (PSI)
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D20

- This a light machine so stress is low
- When the bale is carried you can see the slight shift of pressure to the front rollers on the track represented in the plot.


NEW HOLLAND
C232


NEW HOLLAND
C232


NEW HOLLAND
C232


NEW HOLLAND
C232

2019 Dundas Soil and Crop Compaction Event

Exhibit: D21
New Holland L228
Skid Steer Loader


21
W1+2
NEW HOLLAND

Exh: D21

Weight: Loaded with bale/Unloaded

2720/3120
14-19.5

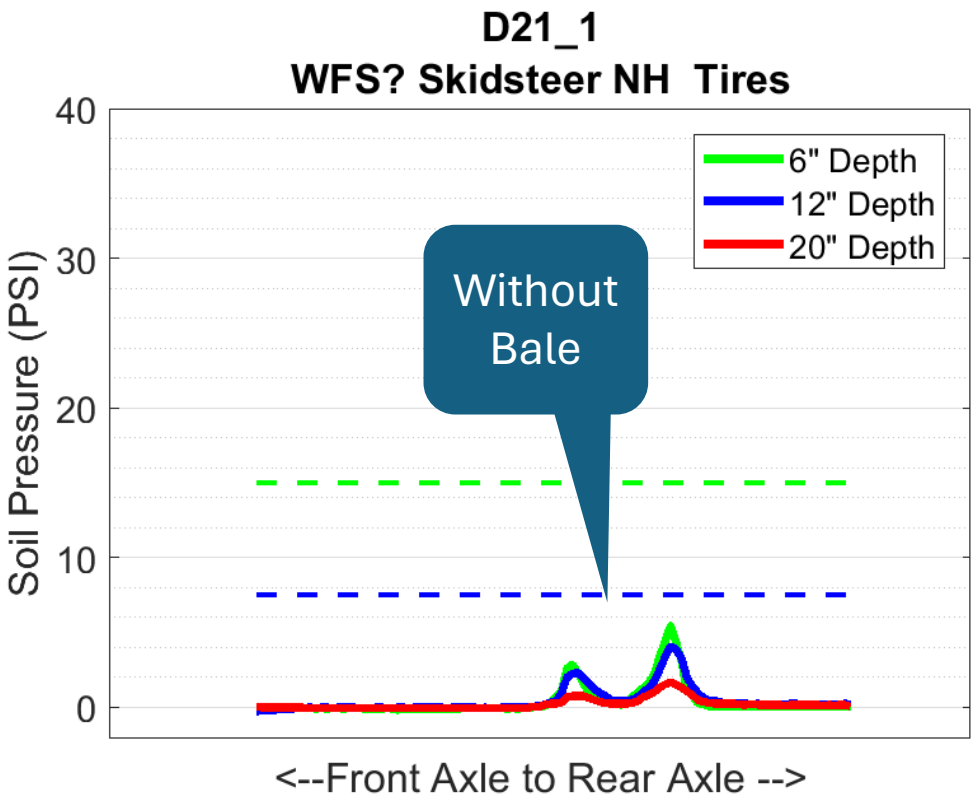
1560/840
14-19.5

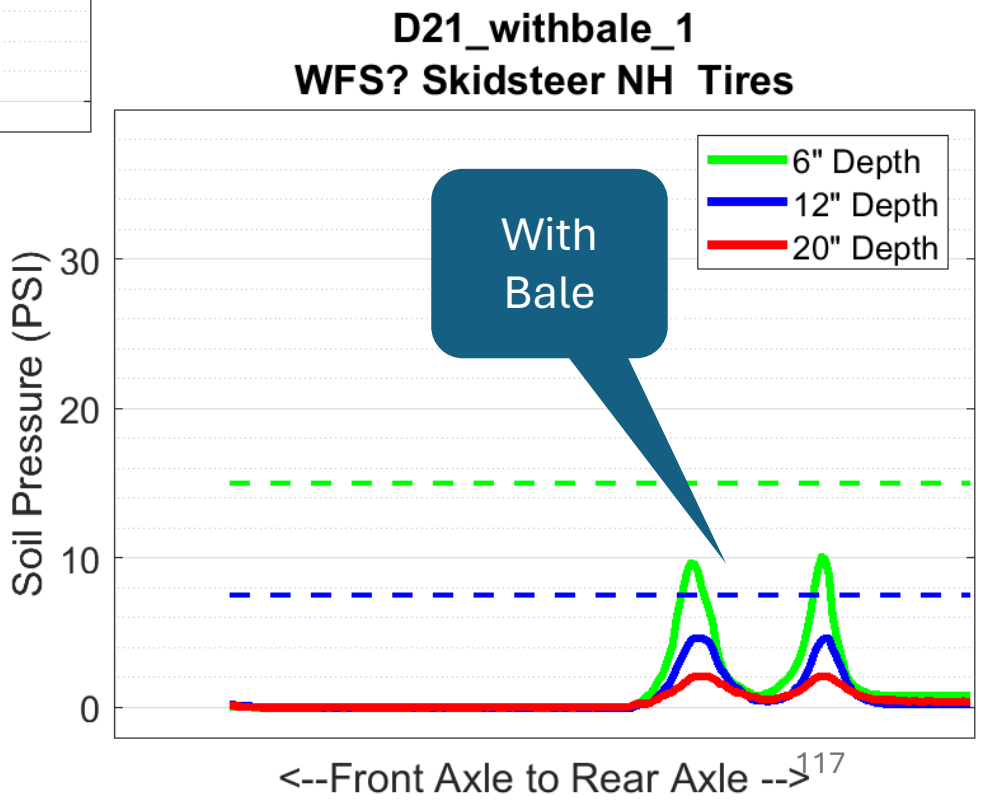
New Holland L228 Skid Steer Loader
8,680/8000 lbs (4.3/4.0 T)

53 PSI

2260/2620
14-19.5

2140/1420
14-19.5


D21_1
WFS? Skidsteer NH Tires
6" Depth
12" Depth
20" Depth
Without Bale
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D21_withbale_1
WFS? Skidsteer NH Tires
6" Depth
12" Depth
20" Depth
With Bale
Soil Pressure (PSI)
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D21

- Although a much lighter machine than the tracked skid steer there is much high soil stress both with and without the bale.
- Bias tires requiring high PSI (53) transfers more weight into the soil than better tires with lower PSI.


21
W1+2
L228
NEW HOLLAND


21
L228
NEW HOLLAND


NEW HOLLAND


L228
NEW HOLLAND

2019 Dundas Soil and Crop Compaction Event

Exhibit: D22
New Holland SP275F SP Sprayer w Automated CTIS Inflation/Deflation System & 710s vs VF380s

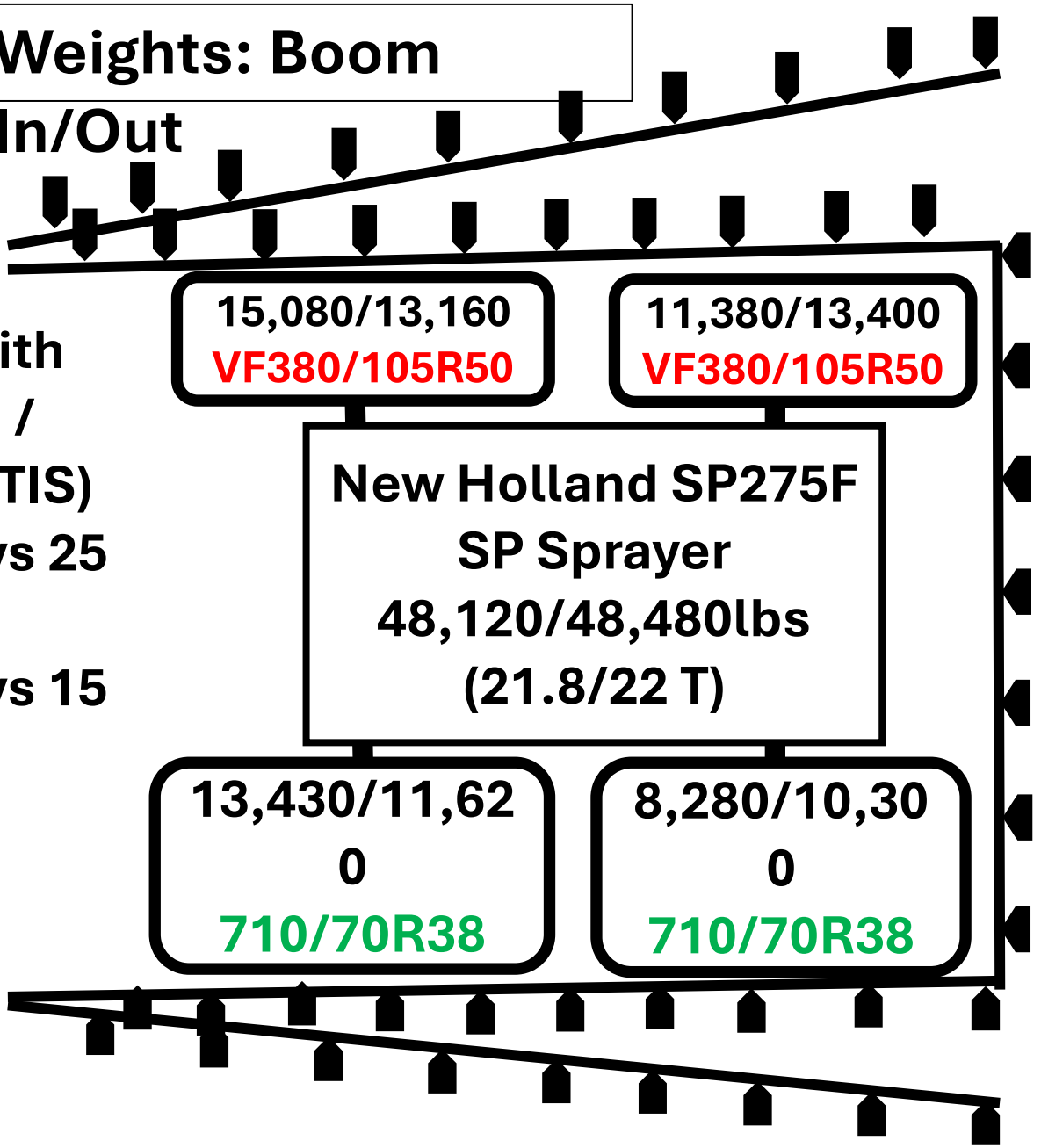

NEW HOLLAND
A+B
L+R
22
710/70R38
VF380/105R50

Exh: D22

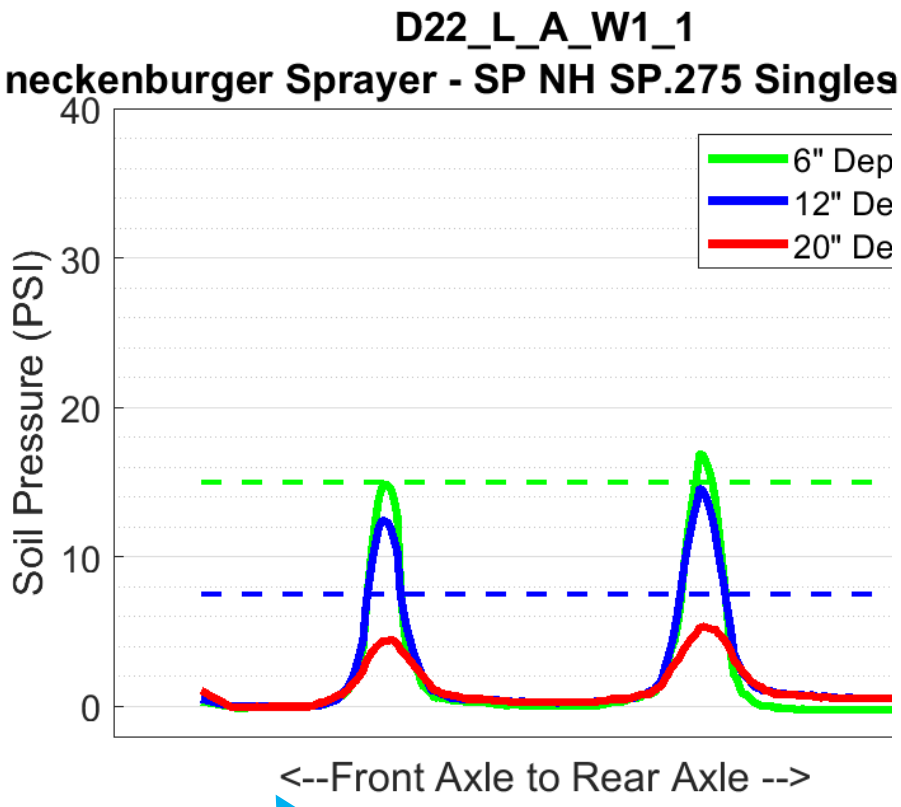
Weights: Boom In/Out

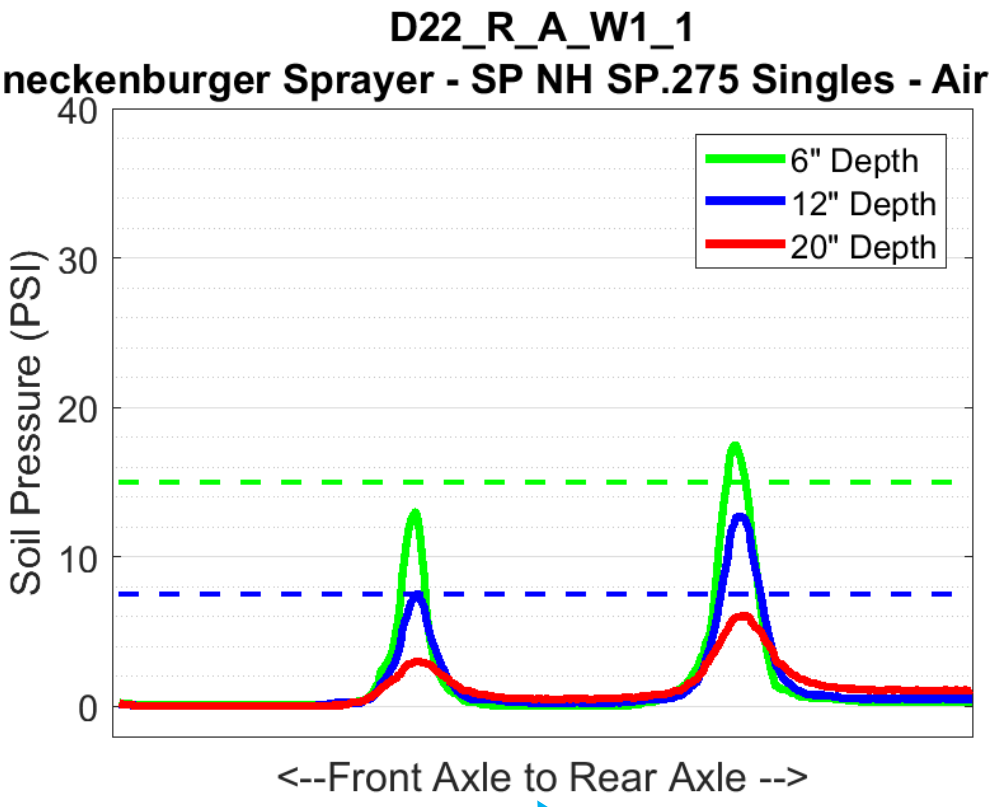
Sprayer Equipped with Automated Inflation / Deflation System (CTIS)

1. 380's – 45 vs 15 vs 25 PSI
2. 710's – 20 vs 20 vs 15 PSI



Graph 1

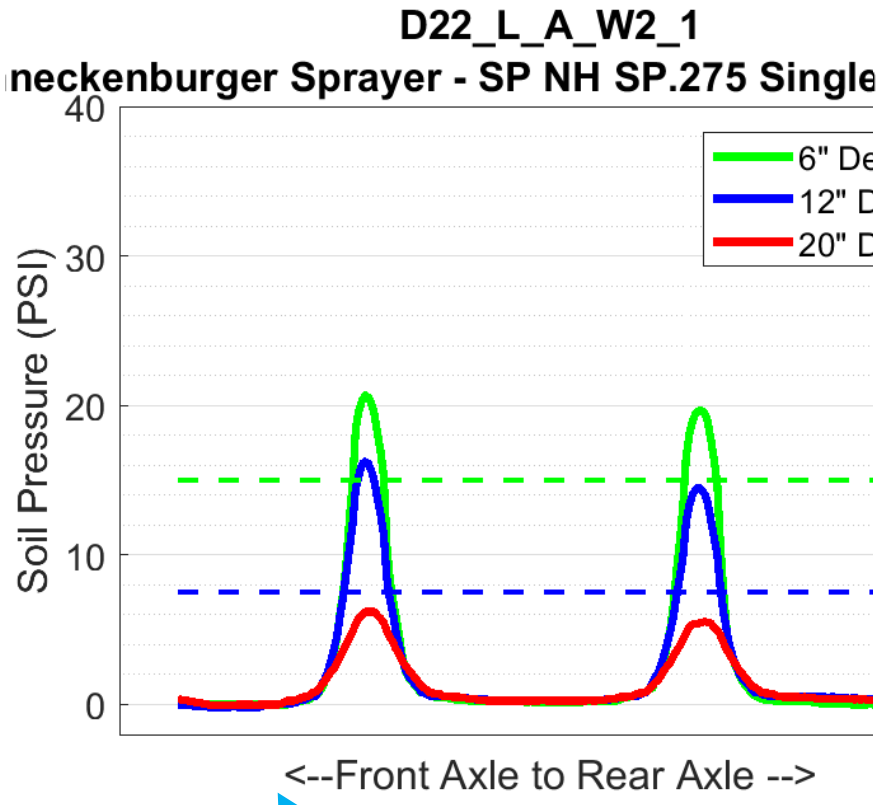


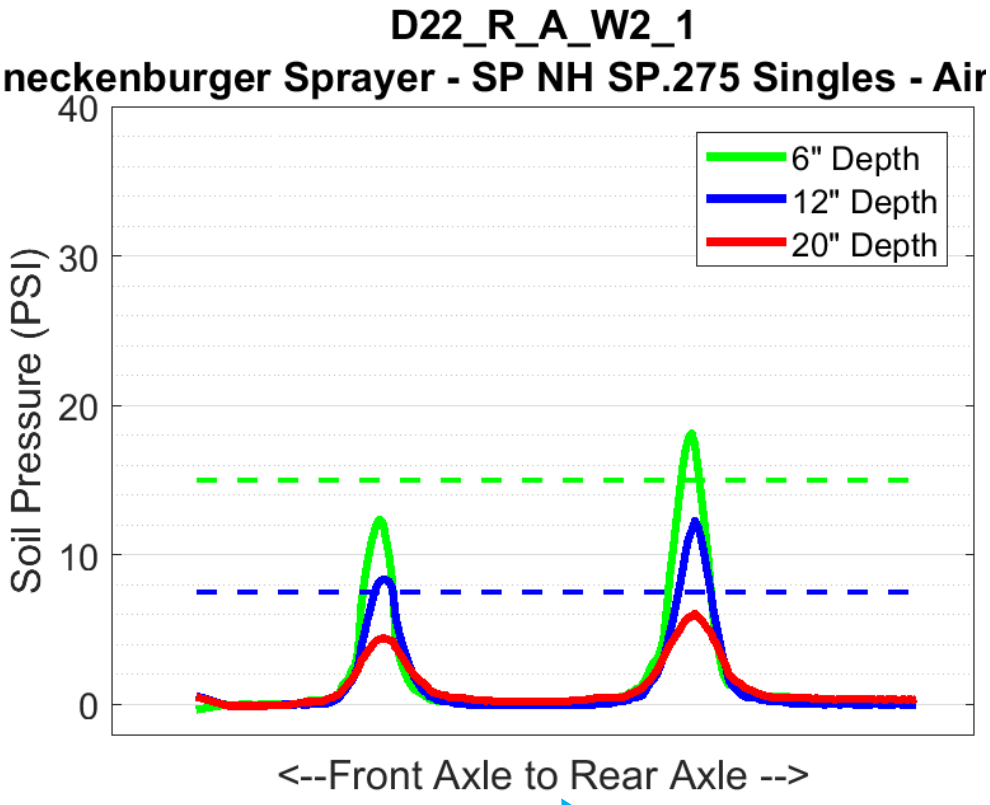


Boom Road
380/105R50
High PSI (45)

Boom Road
710/70R38
High PSI (20)

Graph 2

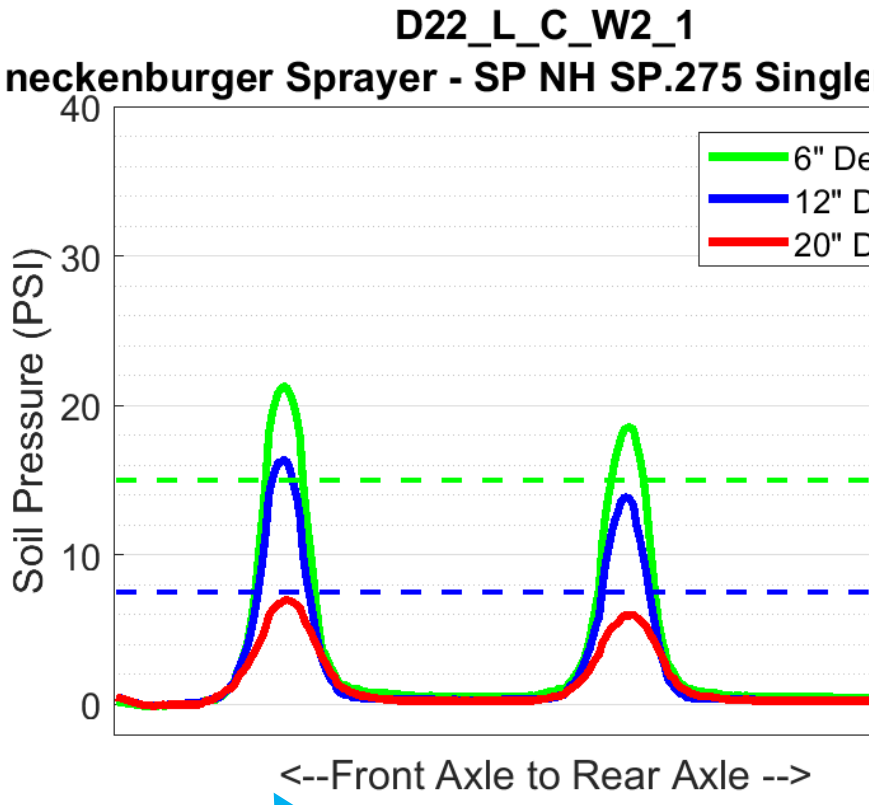


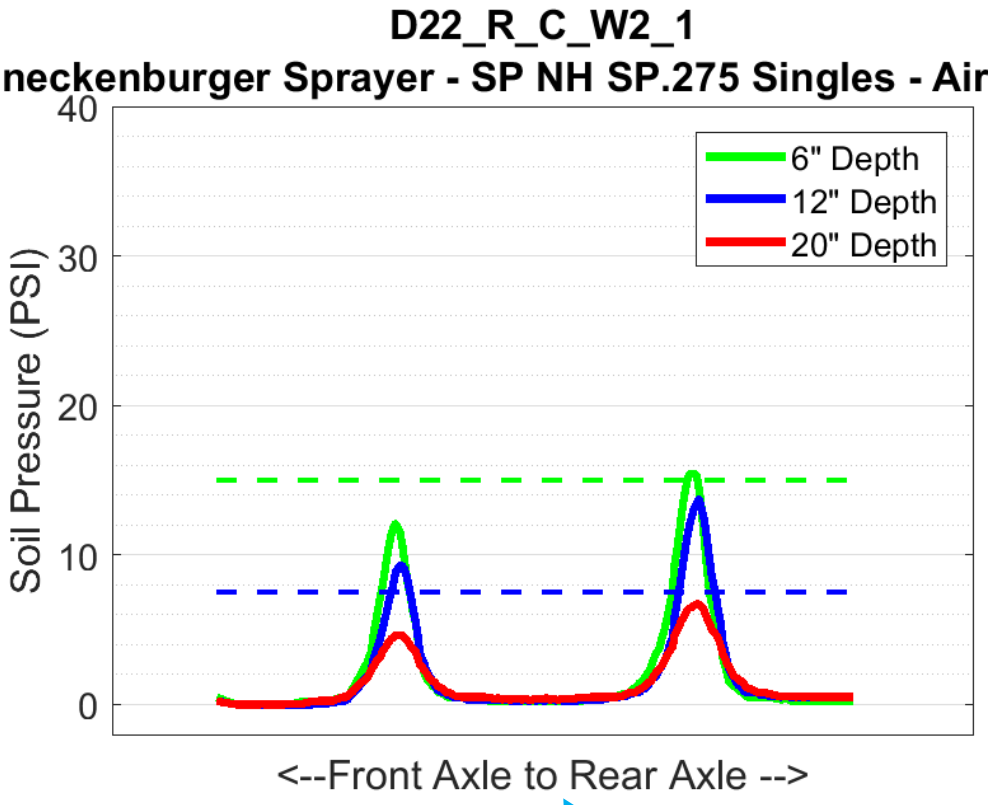


Boom Field
380/105R50
High PSI (45)

Boom Field
710/70R38
High PSI (20)

Graph 3

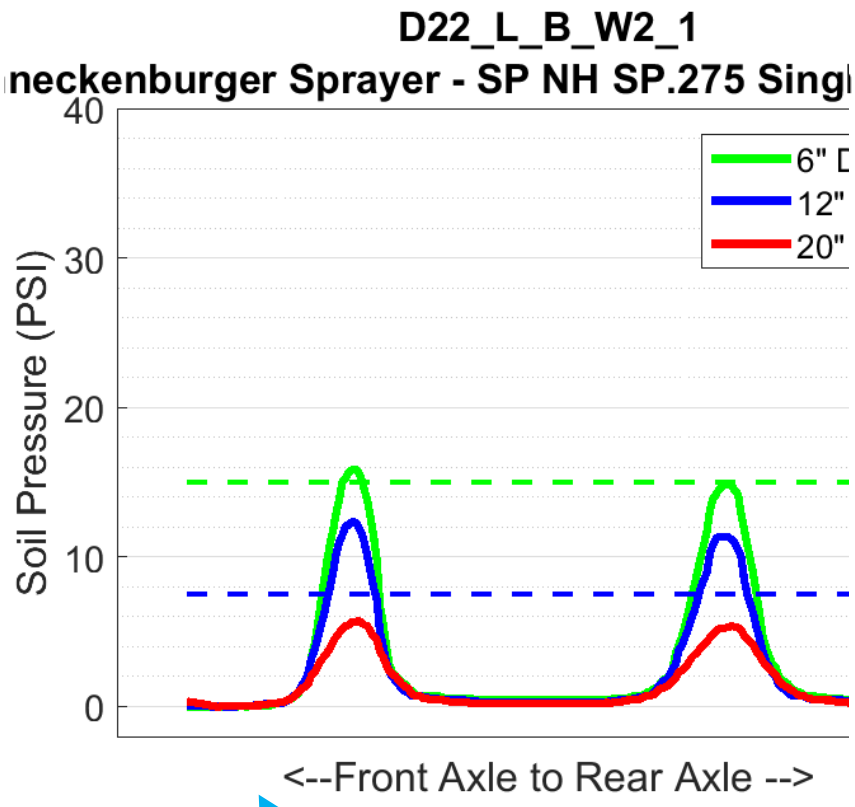


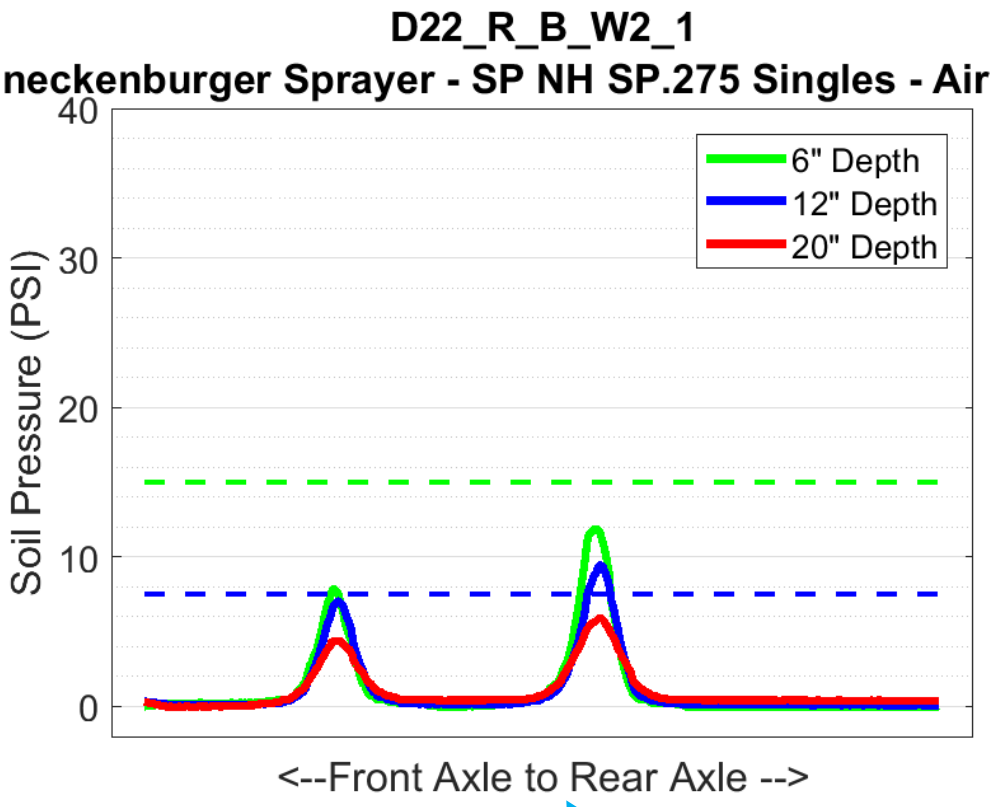


Boom Field
380/105R50
High PSI (45)

Boom Field
710/70R38
High PSI (20)

Graph 5





Boom Field
380/105R50
Low PSI (15)

Boom Field
710/70R38
Low PSI (20)

Plot Comments- D22

- This sprayer is heavier on the left side which was equipped with the narrower tire (380 vs 710).
- Road vs Field boom setting moves weight from back to front on this sprayer.
- In field, the wider tire was better than the narrower regardless because the required PSI is lower.
- Lower pressure was better for each tire size at the 6 and 12” depths
- At the 20” depth, the total weight of the unit meant similar stress was detected regardless of tire or pressure.
- Graph1 – Road boom position and higher PSI showed not difference between Vf380s & 710s.
- Graph 2 – Field boom position and lower rated PSI resulted in less stress with 710 larger tires.
- Graph3 – a second repeat of graphs from Graph2 showing slight differences due to testing in different pit and day.
- Graph4 – boom in field position with low Psi showing more change in 6” stress with 710s, but at 12” and 20” the stress is nearly same as high PSI because it’s the total implement weight that is the main factor.


NEW HOLLAND


NEW HOLLAND
NEW HOLLAND


NEW HOLLAND


NEW HOLLAND

2019 Dundas Soil and Crop Compaction Event

Exhibit: D23
CaseIH Patriot 4430 Self Propelled Sprayer w 380s


23
A+B
4430
PATRIOT
CASE
S-14

Exh: D23

9,920/10,700
380/90R46

9,560/8,780
380/90R46

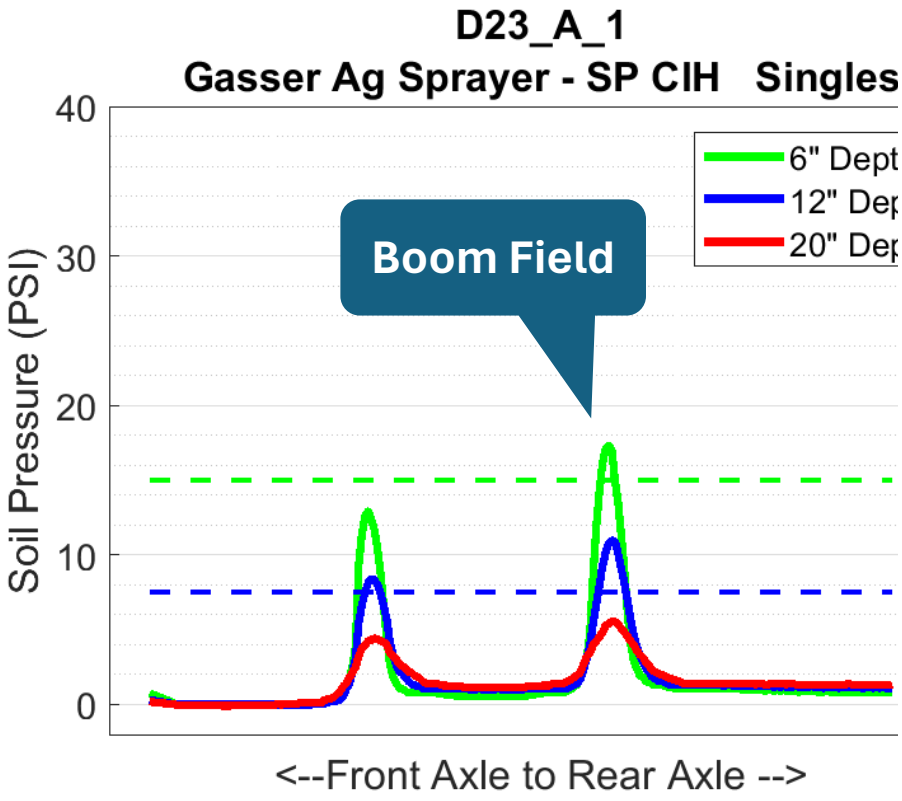
CaseIH Patriot 4430 SP
Sprayer
40,220/39,560 lbs
(18.2/17.9 T)

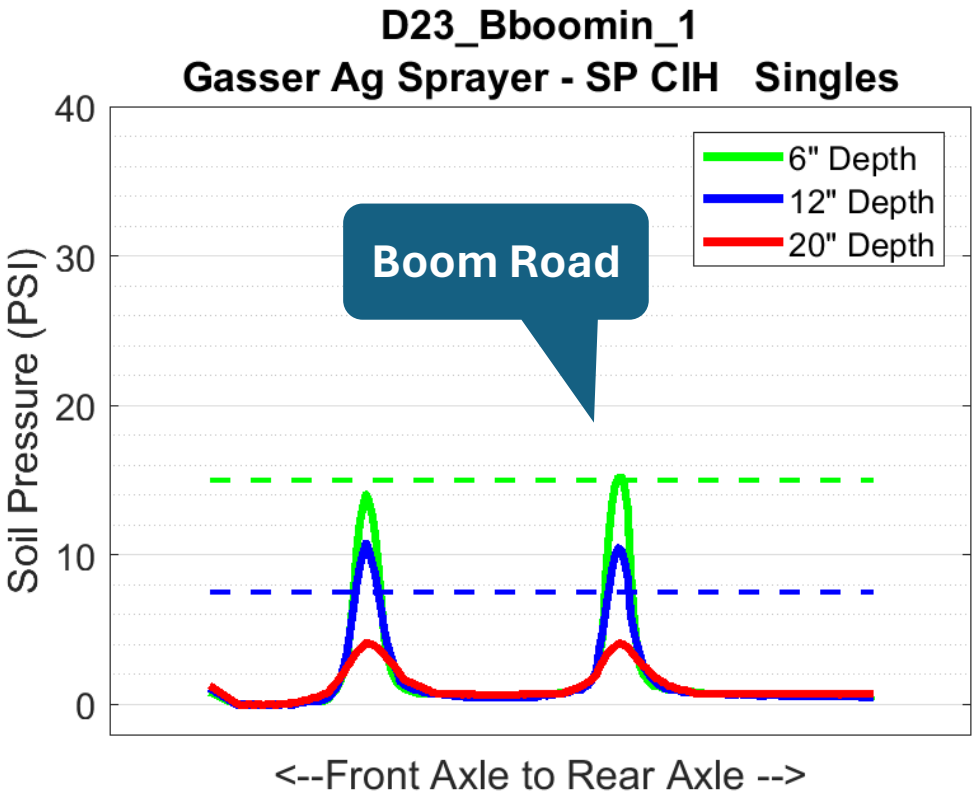
41 PSI
all
tires

10,500/10,340
380/90R46

10,240/9,740
380/90R46

Weights: Boom In /Out


D23_A_1
Gasser Ag Sprayer - SP CIH Singles
Soil Pressure (PSI)
40
30
20
10
0
6" Dept
12" Dep
20" Dep
Boom Field
<--Front Axle to Rear Axle -->


D23_Bboomin_1
Gasser Ag Sprayer - SP CIH Singles
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
Boom Road
<--Front Axle to Rear Axle -->

Plot Comments – D23

- These plots again show high pressure in the topsoil from high pressure tires
- Notice the weight distribution when the boom is folded in
- These 380s exceeded stress level at 12” and barley at 6”despite the high PSI
- At 20” the overall weight causing stress a function of equipment weight


23
A+B

2019 Dundas Soil and Crop Compaction Event

Exhibit: D24
AGCO Terragator TG8300B Trike Dry Fertilizer Spreader w 1000s


Challenger
24
W1+2
L+R

Exh: D24

14,900/14,900
1000/50R25

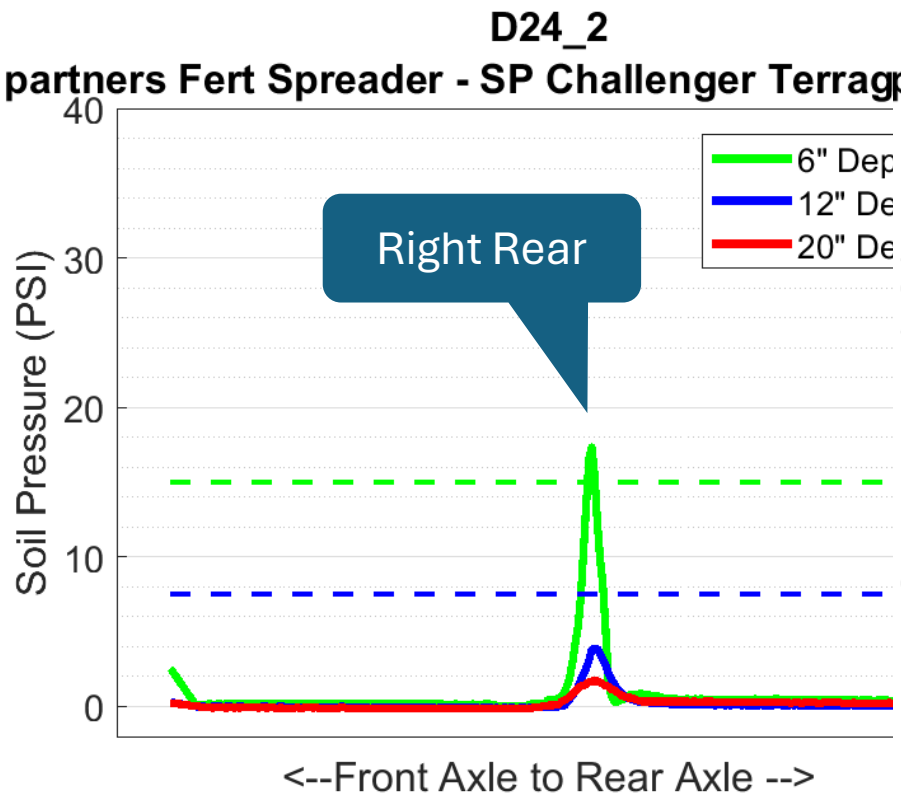
Weight: Boom In/Out

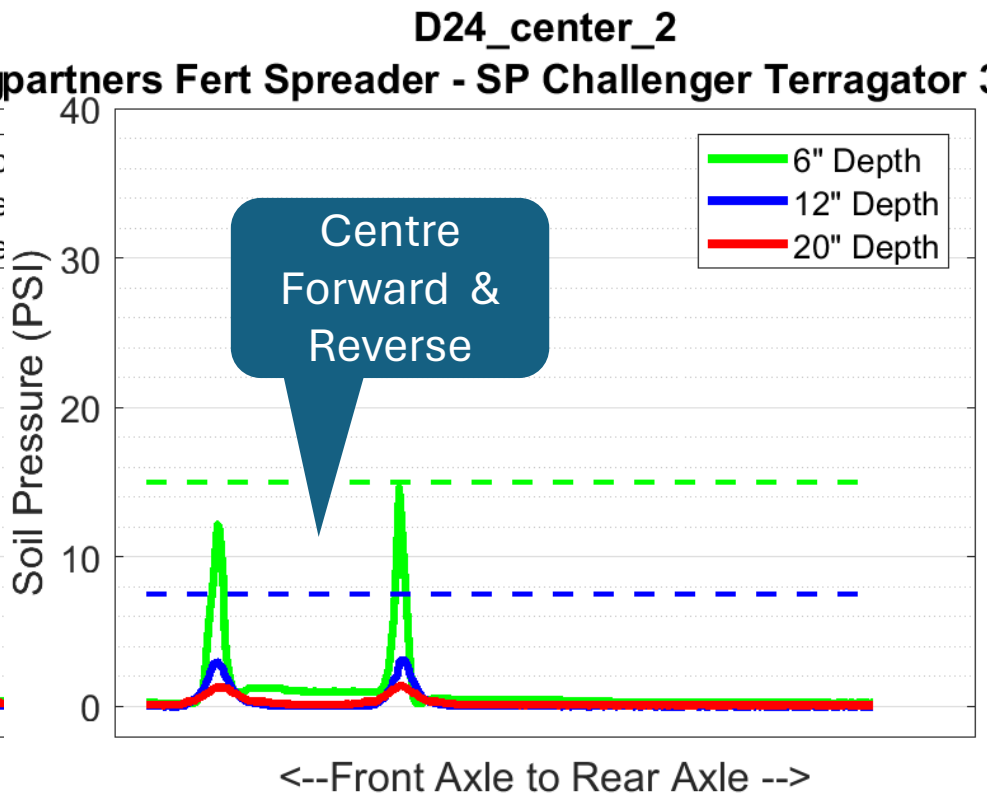
AGCO Terragator
TG8300B
40,580/41760 lbs
(20.3/20.8 T)

12,100/11,700
1000/50R25

13,580/15,160
1000/50R25

35 PSI all tires


D24_2
partners Fert Spreader - SP Challenger Terrag
Right Rear
6" Dep
12" De
20" De
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D24_center_2
partners Fert Spreader - SP Challenger Terragator 3
Centre Forward & Reverse
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D24

- The first plot is the right side rear tire.
- The second plot is the front tire as it drove over and the reversed over the sensor to avoid the measurement equipment.
- Relatively high PSI by weight causing slight spike in 6” stress
- Weight relative to tire size a good configuration for this soil since 12” and 20” sensors not receiving much pressure.


24
W1+2
L+R


TerraGator
TerraGator

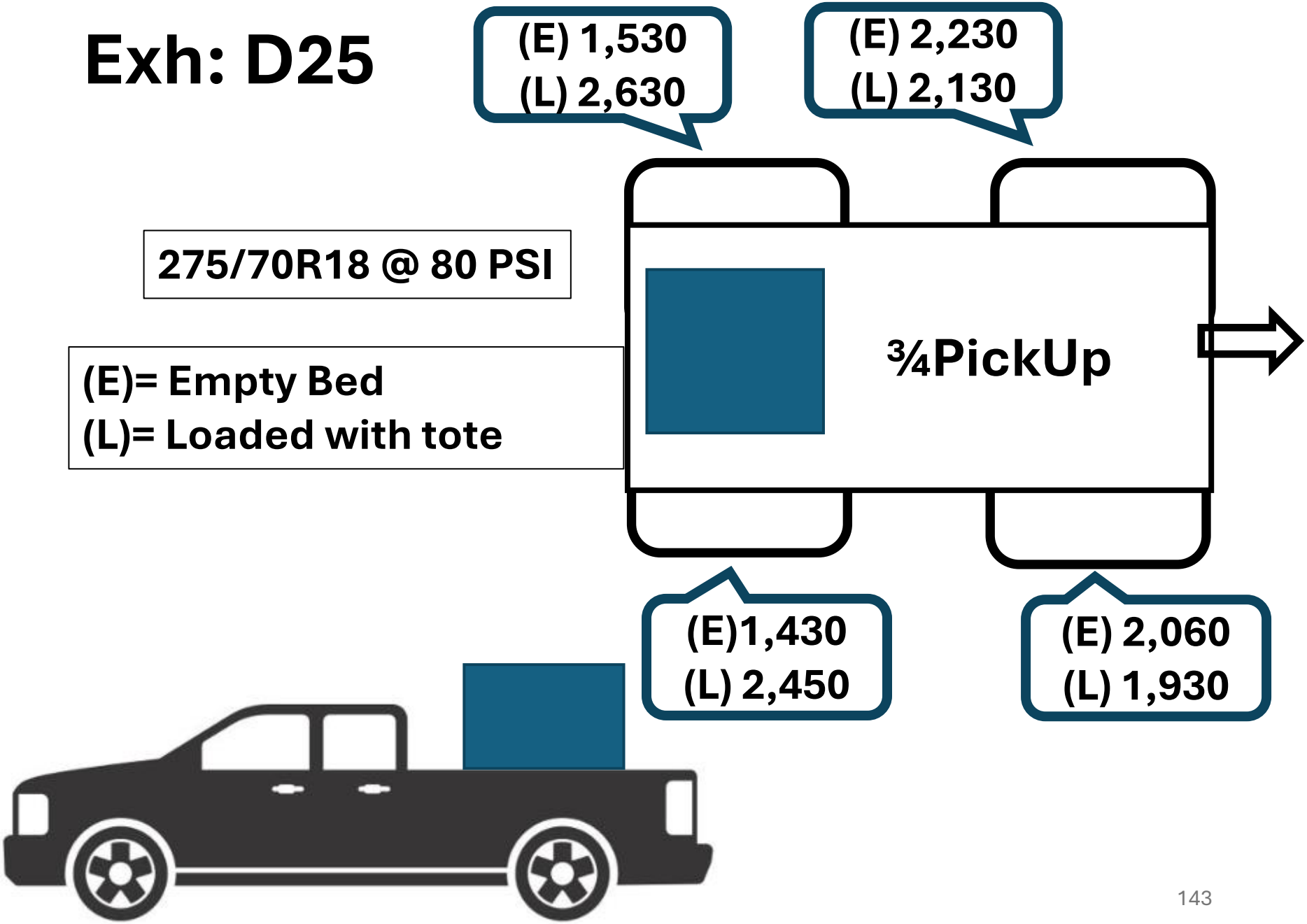

24
W1+2
L+R
TerraGator
NORTH
CVT

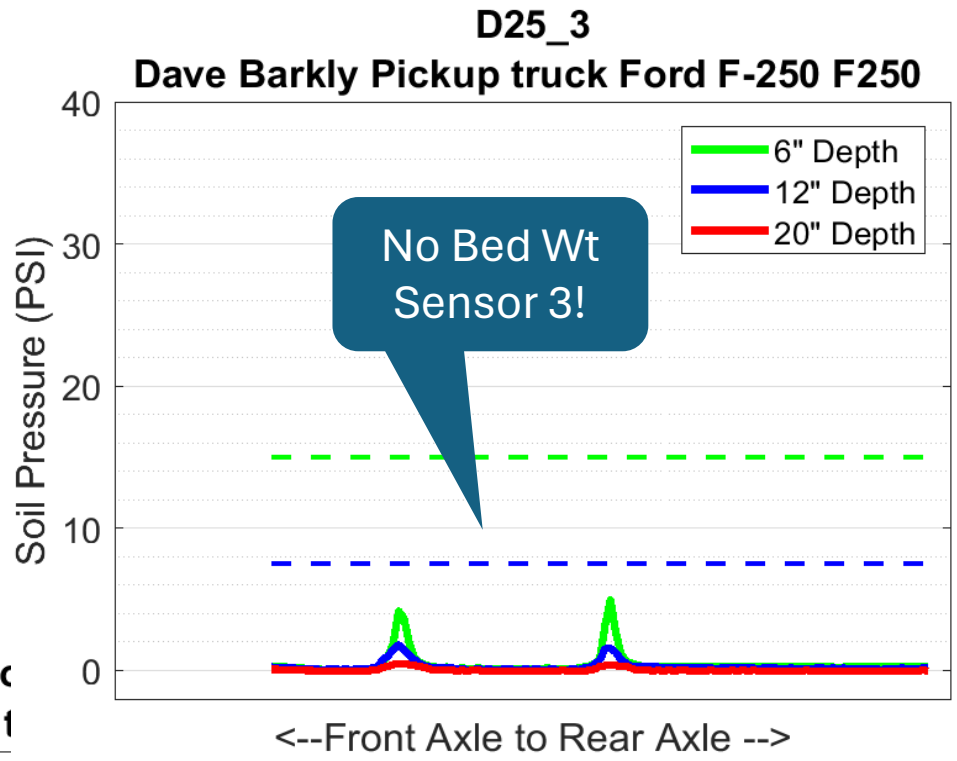
2019 Dundas Soil and Crop Compaction Event

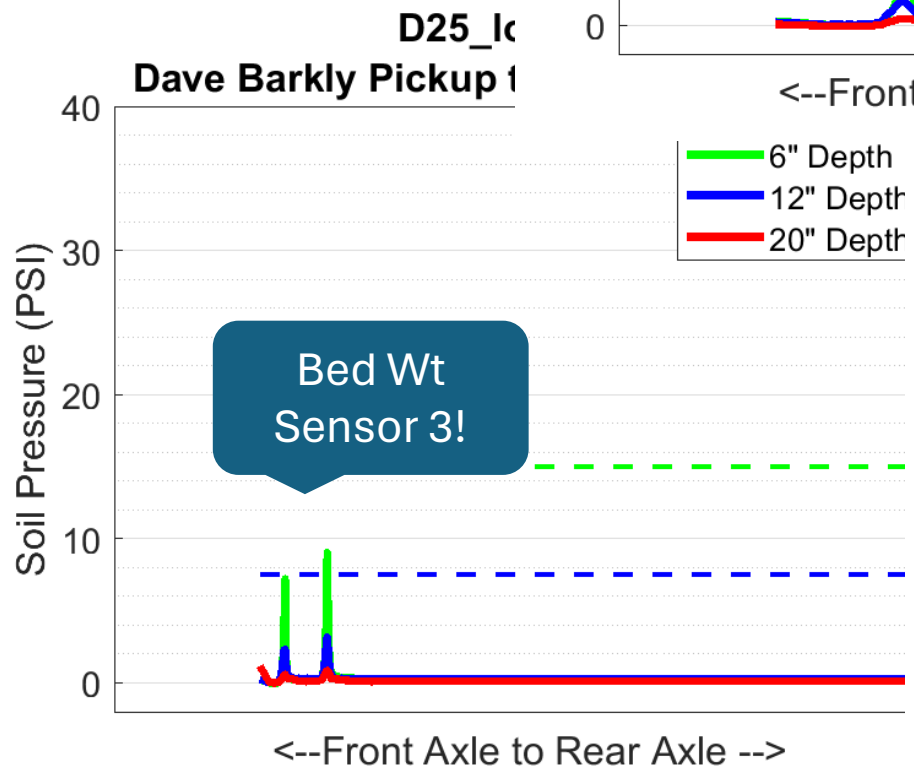
Exhibit: D25
Ford F-250 w/wo Loaded and 275/70R18 High PSI Tires

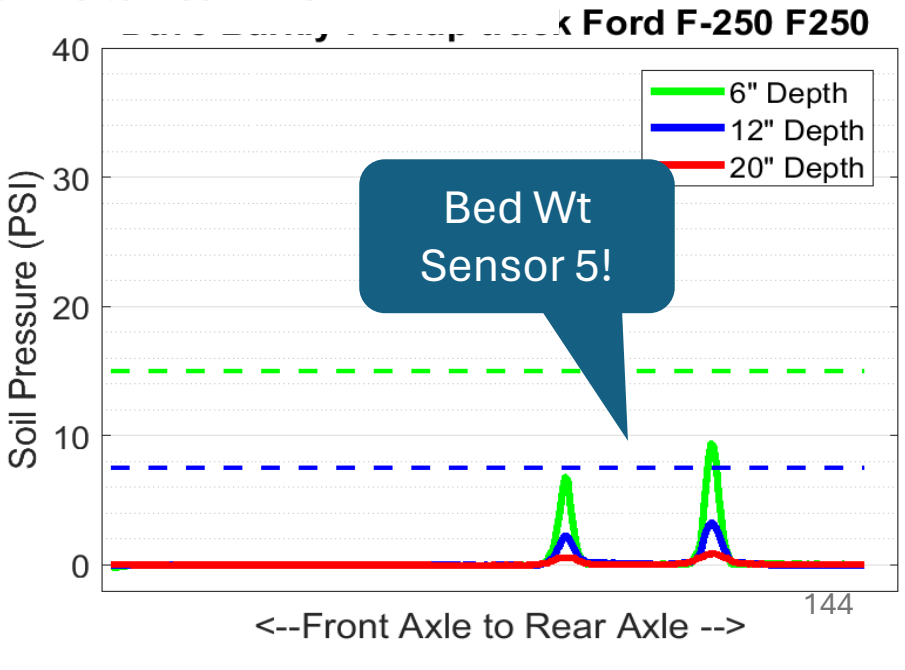

25
W1+2
ROAD ARMOR
ONTARIO
BA 25695

Exh: D25


(E) 1,530
(L) 2,630
(E) 2,230
(L) 2,130
275/70R18 @ 80 PSI
(E)= Empty Bed
(L)= Loaded with tote
¾PickUp
(E)1,430
(L) 2,450
(E) 2,060
(L) 1,930


D25_3
Dave Barkly Pickup truck Ford F-250 F250
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
No Bed Wt Sensor 3!
<--Front Axle to Rear Axle -->


Dave Barkly Pickup t
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
Bed Wt Sensor 3!
<--Front Axle to Rear Axle -->


Ford F-250 F250
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
Bed Wt Sensor 5!
<--Front Axle to Rear Axle -->

Plot Comments – D25

- The left two plots show the increase in pressure when weight is added to the vehicle.
- The right plot is again with weight in the vehicle at a difference sensor installation.


25
W1+2


RACK
RACK
FX4
Ford
BA 25695
ROAD ARMOR


25
W1+2
ROAD ARMOR

2019 Dundas Soil and Crop Compaction Event

Exhibit: D26

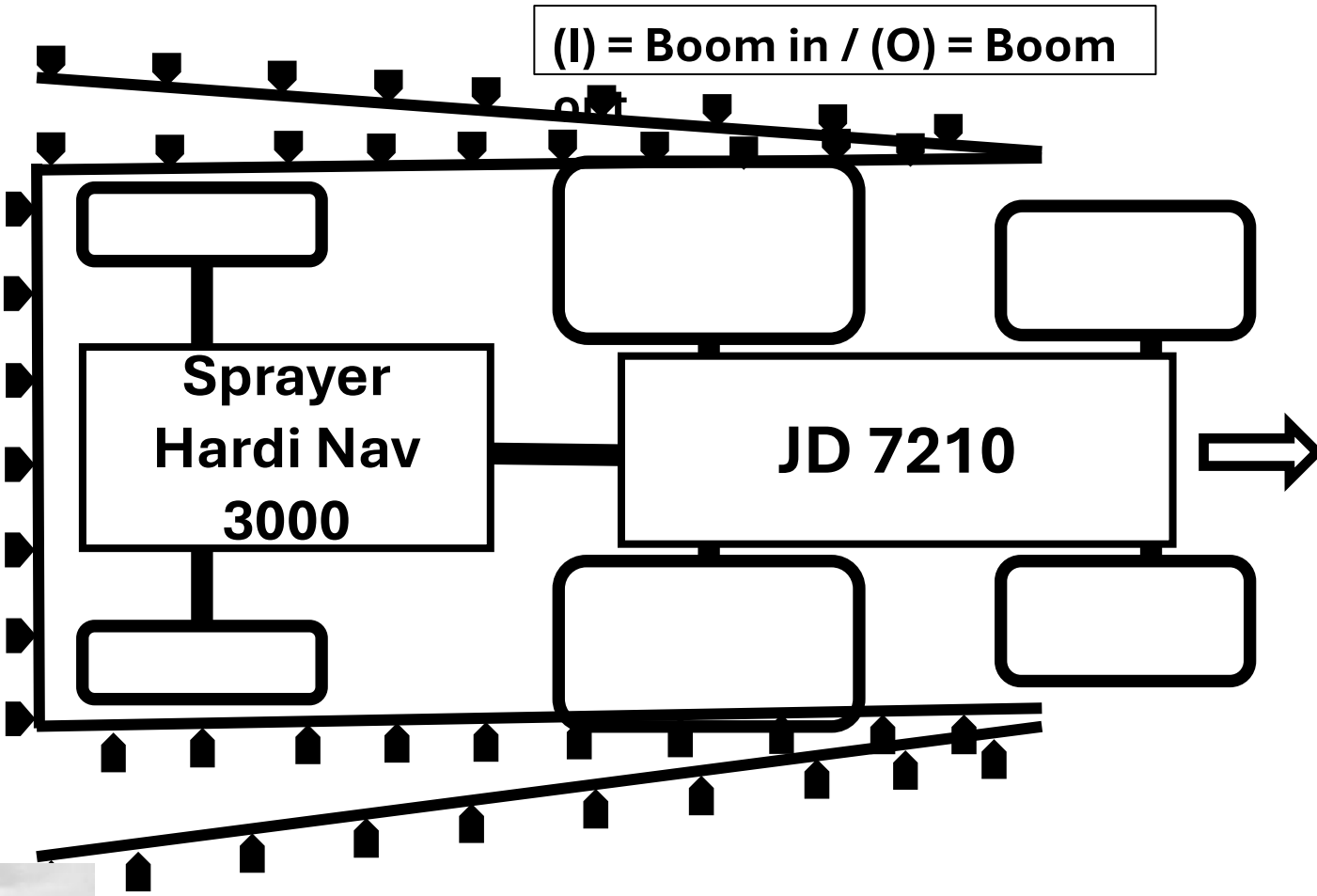
Hardi 3000 Navigator Pull Type Sprayer with 320 vs VF380 Tires

Tire Set 1: 320/90R46 – 41 PSI

Tire Set 2: VF380/90R46 – 32 PSI

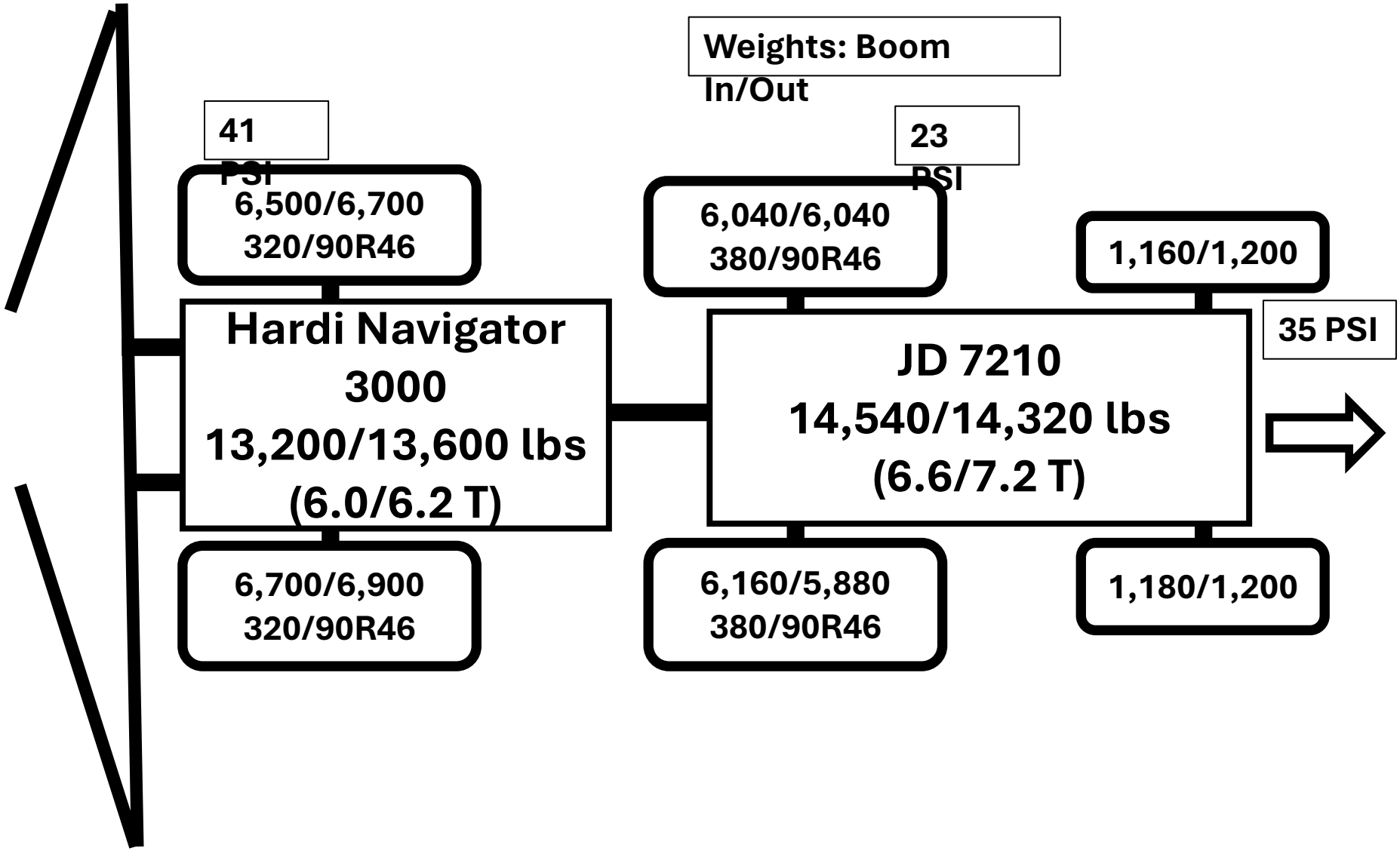

26
L+R
7210
JOHN DEERE
HARDI
NAVIGATOR 3000

Exh: D26

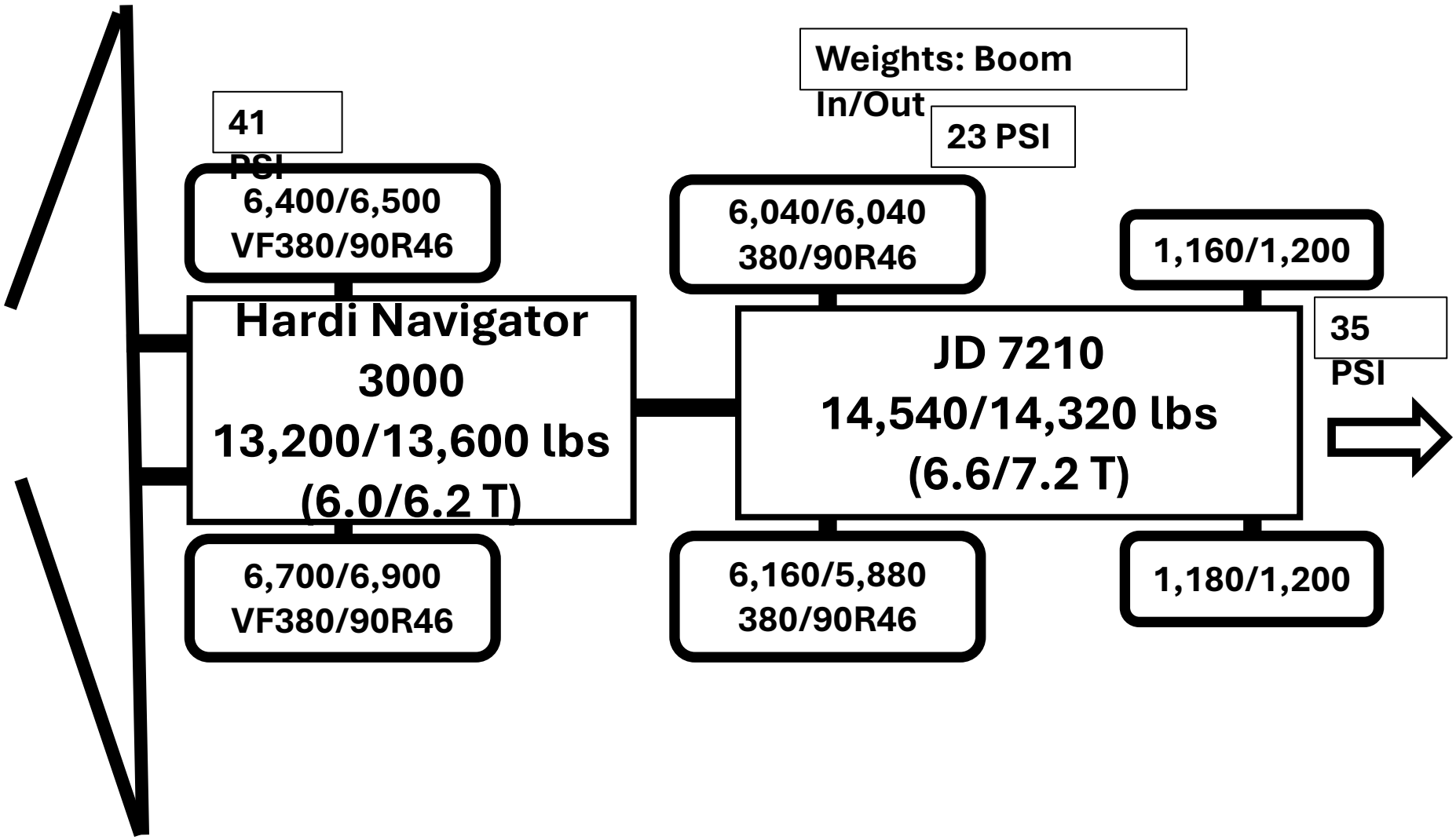


Tire Set 1: 320/90R46 – 32 PSI – Left 6,500(i), 6,700 (o) / Right 6,700(I), 6,900(O)
Tire Set 2: VF380/90R46 – 32 PSI – Left 6,400(i), 6,700 (o) / Right 65,00(I), 6,900(O)

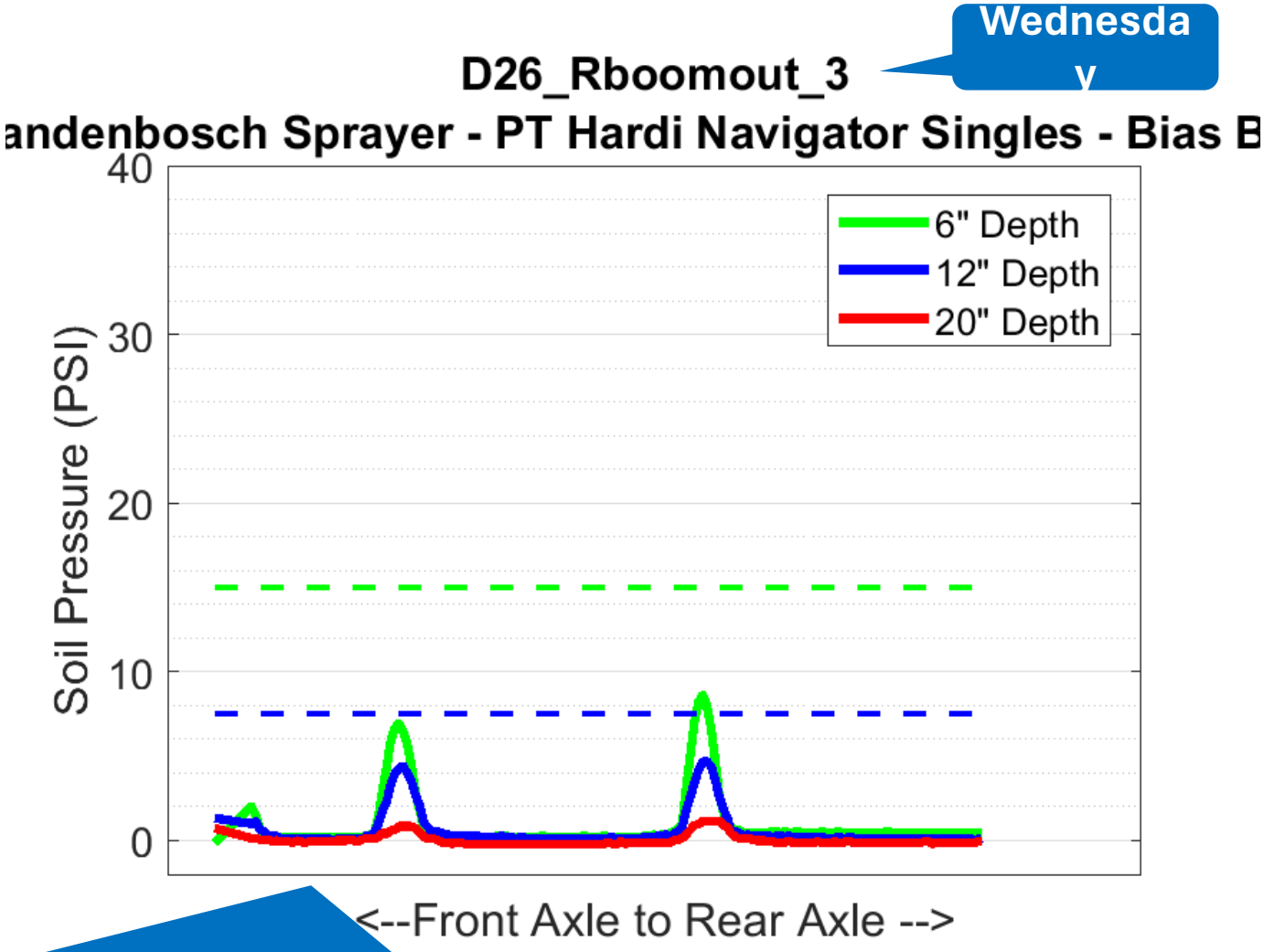
D26A 320/90R46



D26B VF380/90R46



Wednesday

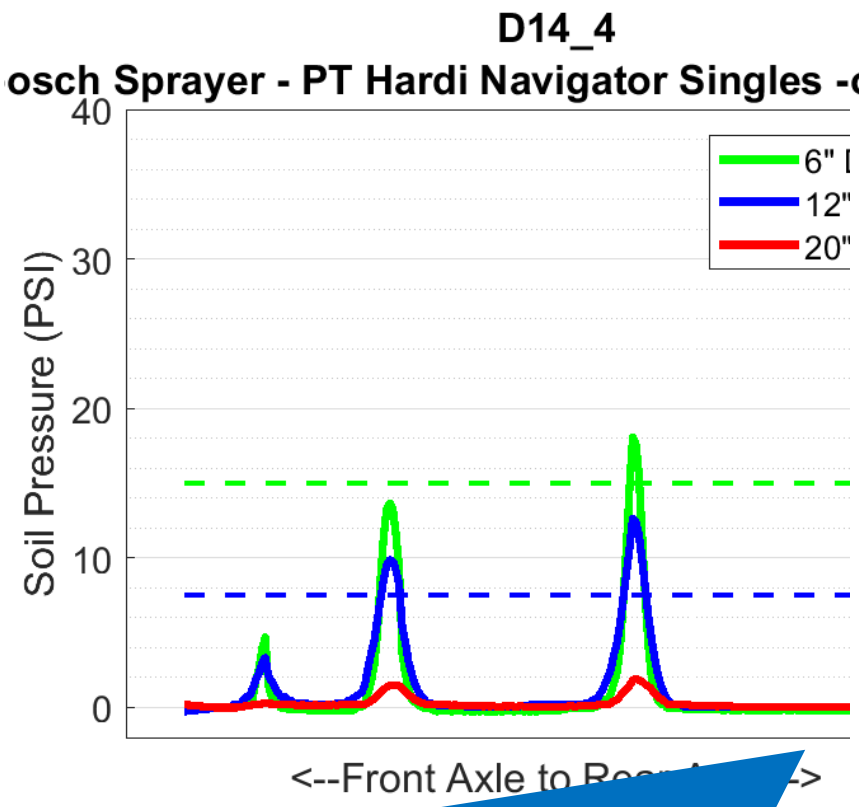


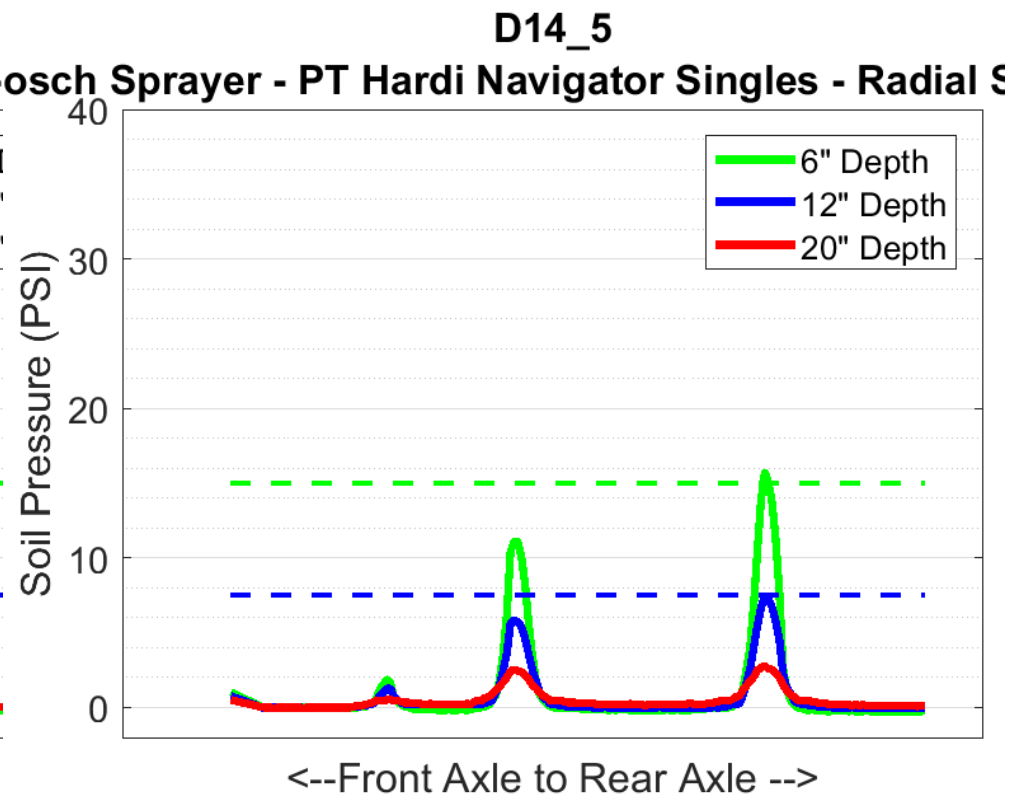
Boom Road setting, 320/90R46, High PSI (41), tested the day before the previous graphs.

Comparisons can't reasonably made between the two tire types as they were tested on different days in different pits.

Thursday AM

Thursday PM





Boom Road setting, VF 380/90R46, High PSI (41)
Two runs of the same tires on two different sensor pits, pointing out the issue with soil differences even close together that can skew the results, although the interpretation remains the same.

Plot Comments – D26

- This PT sprayer was tested with 320s first and then VF 380s resulting in two weigh forms
- The two sets of tires were tested on different days and sensor pits so the results can not be compared between the two tire types
- Due to sensing on different days we can not comment on the performance of the 320 radial vs VF 380 tire.
- There was a substantial rainfall between sensor pits #3 and #4,5 the following day which would have impacted responses.


HARDI
NAVIGATOR 3000


NAVIGATOR 3000
HARDI

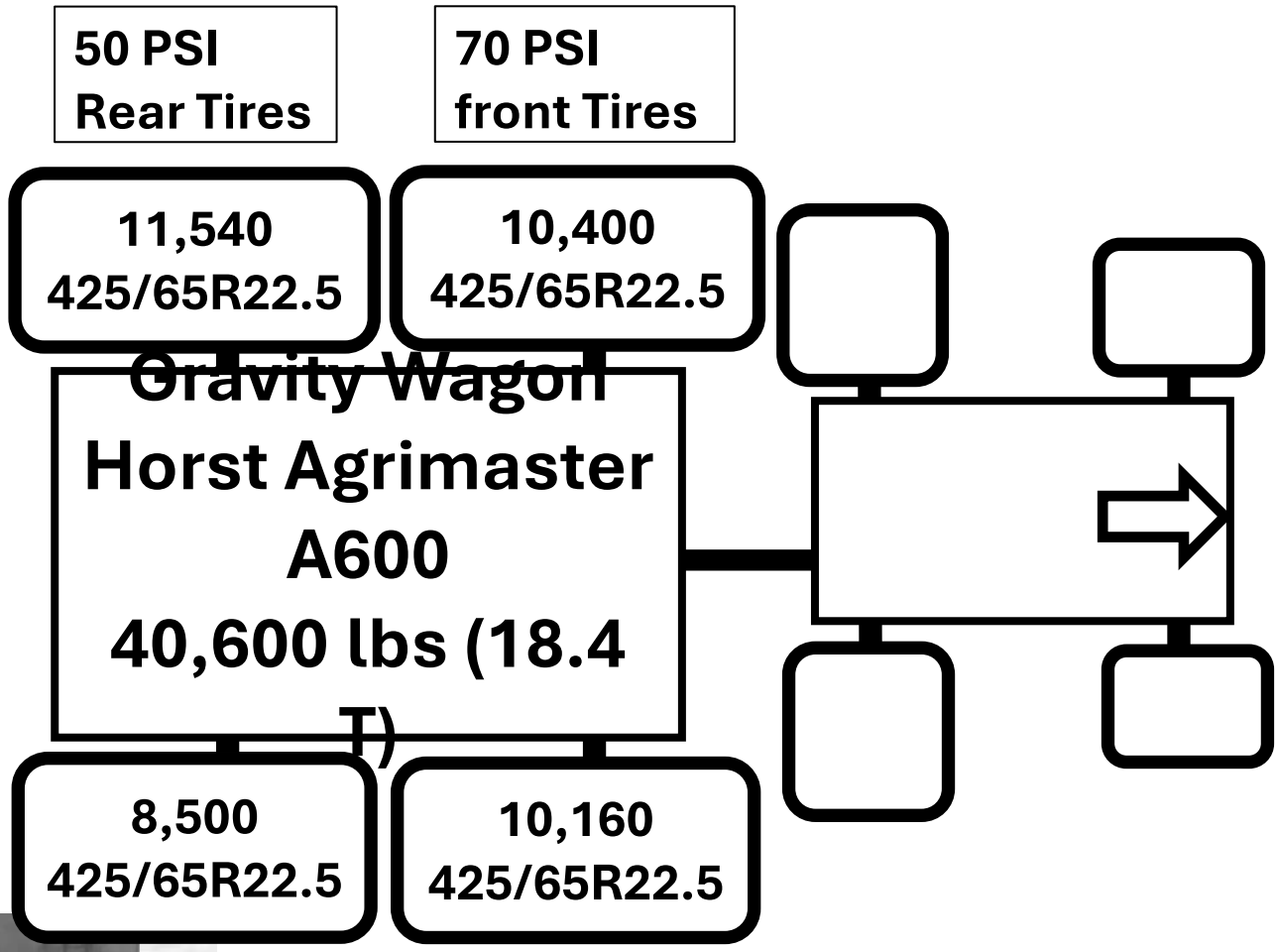

HARDI
NAVIGATOR 3000

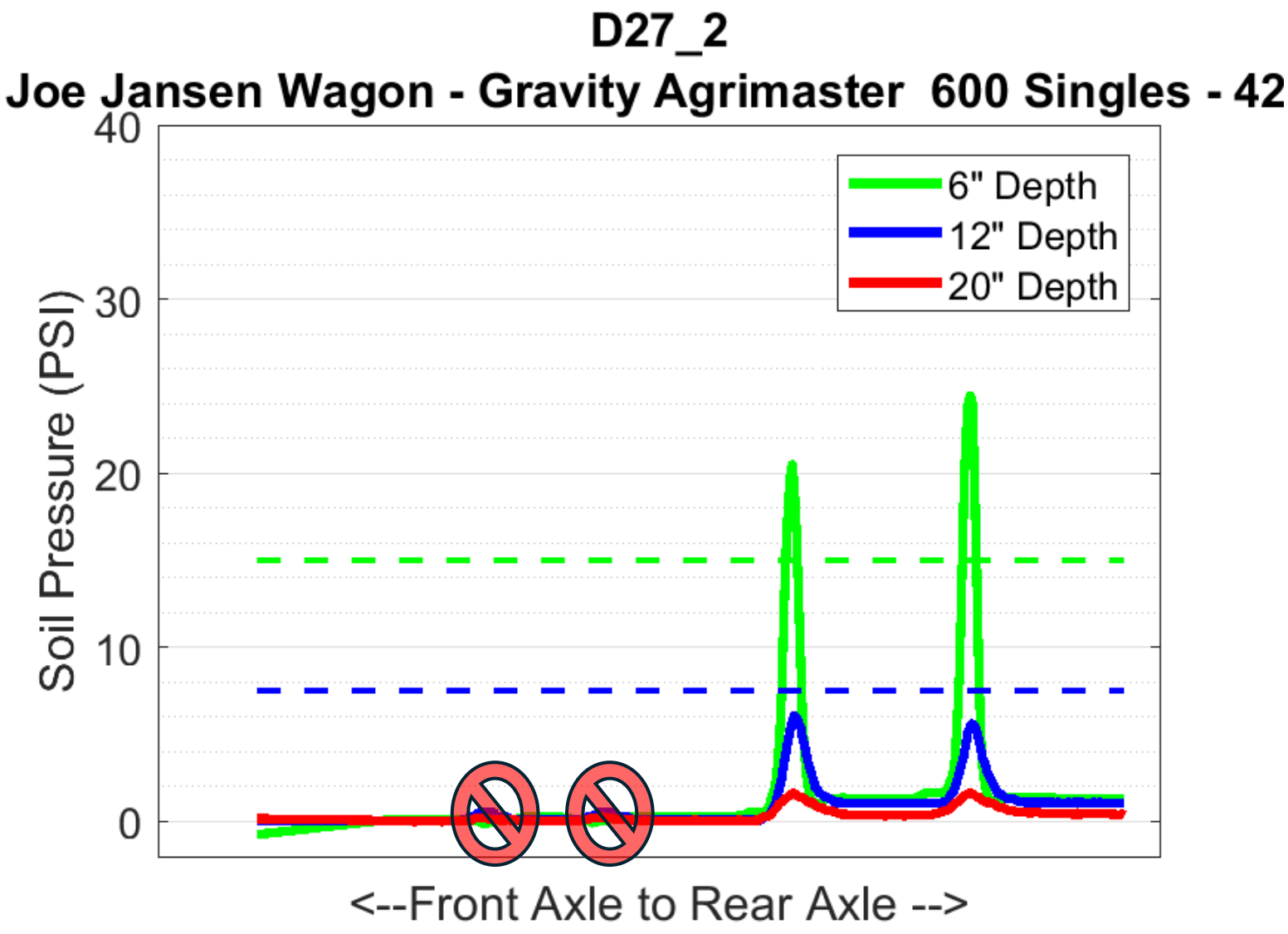
2019 Dundas Soil and Crop Compaction Event

Exhibit D27
Agrimaster A600 Gravity Wagon with 425 Radials


27
MASSEY FERGUSON
FL.3819
HORST

Exh: D27


50 PSI
Rear Tires
70 PSI
front Tires
11,540
425/65R22.5
10,400
425/65R22.5
Gravity Wagon
Horst Agrimaster
A600
40,600 lbs (18.4
T)
8,500
425/65R22.5
10,160
425/65R22.5


D27_2
Joe Jansen Wagon - Gravity Agrimaster 600 Singles - 42
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D27

- Very high topsoil stress under grain wagon tires
- This was true for all tire types.
- Notice the strange weight distribution of the wagon.
- This wagon had radial tires - 425/65R22.5 but high inflation psi
- Compare to identical wagon with bias tires (D28)
- Gravity wagons should not be pulled loaded through the field. Best to be loaded close to the entrance and moved directly onto the road.


27


AgriMaster
A600

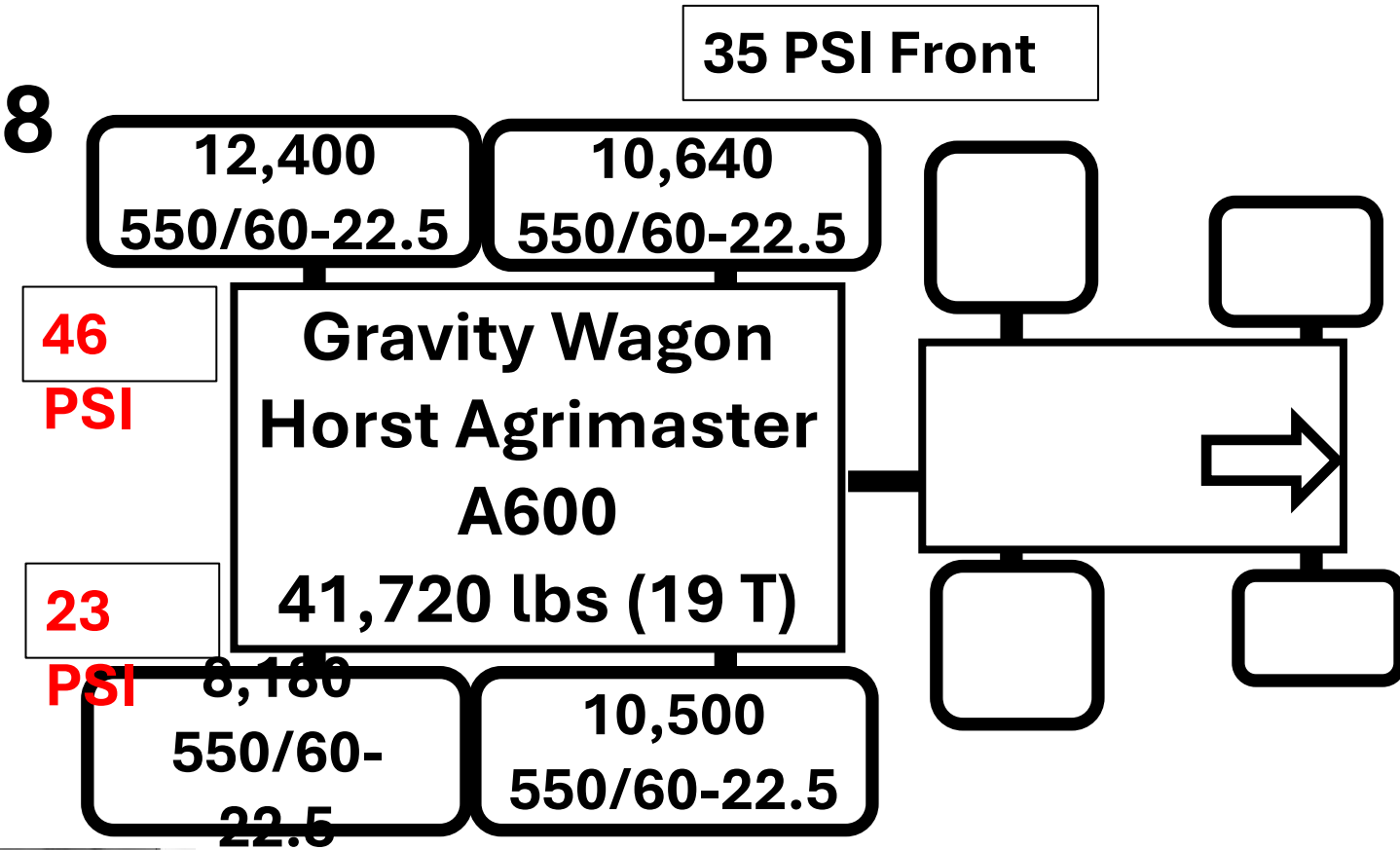

Soil Pressure
TIME

2019 Dundas Soil and Crop Compaction Event

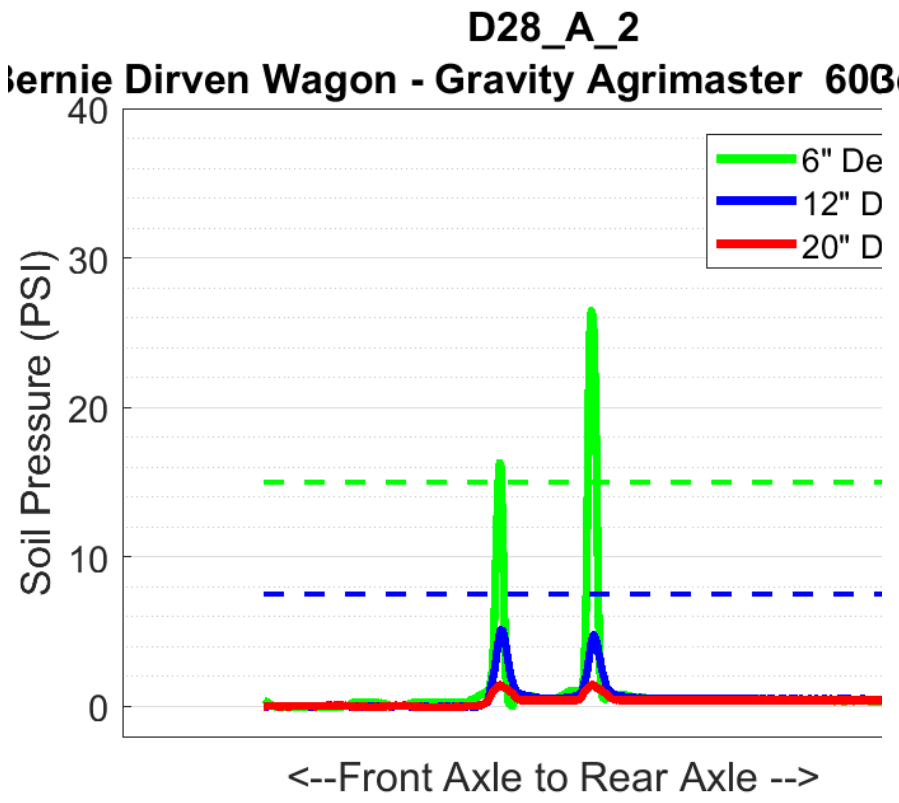
Exhibit: D28
Agrimaster A600 Gravity Wagon with 550 Bias Tires

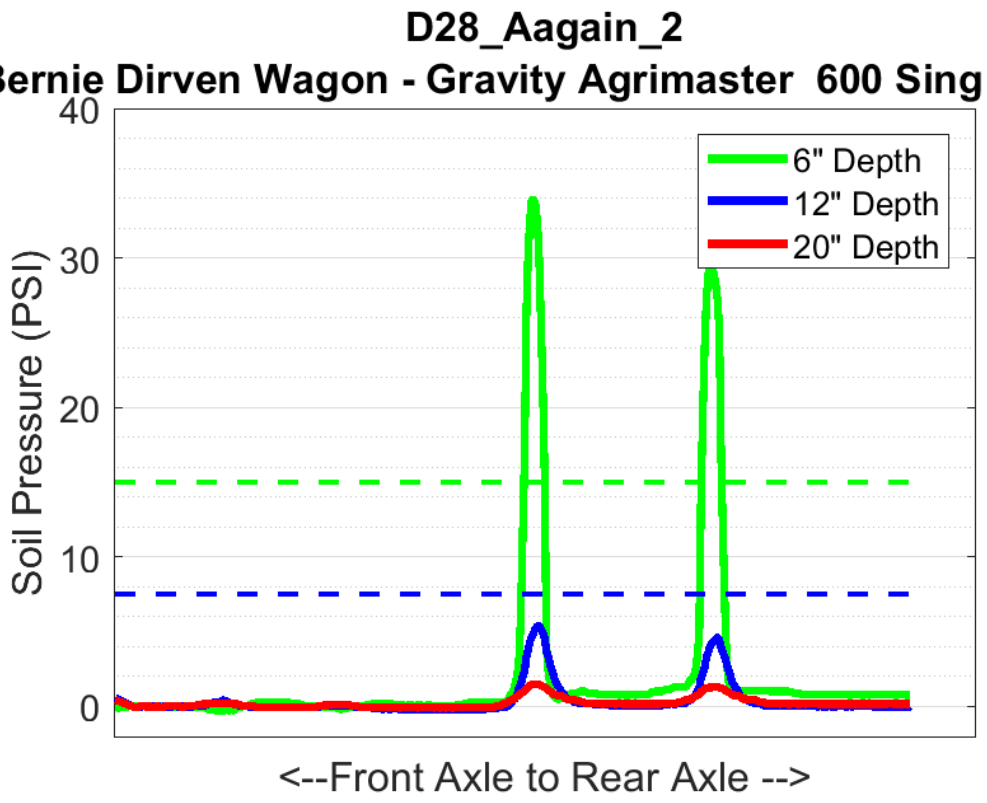

28
MASSEY FERGUSON
HORST

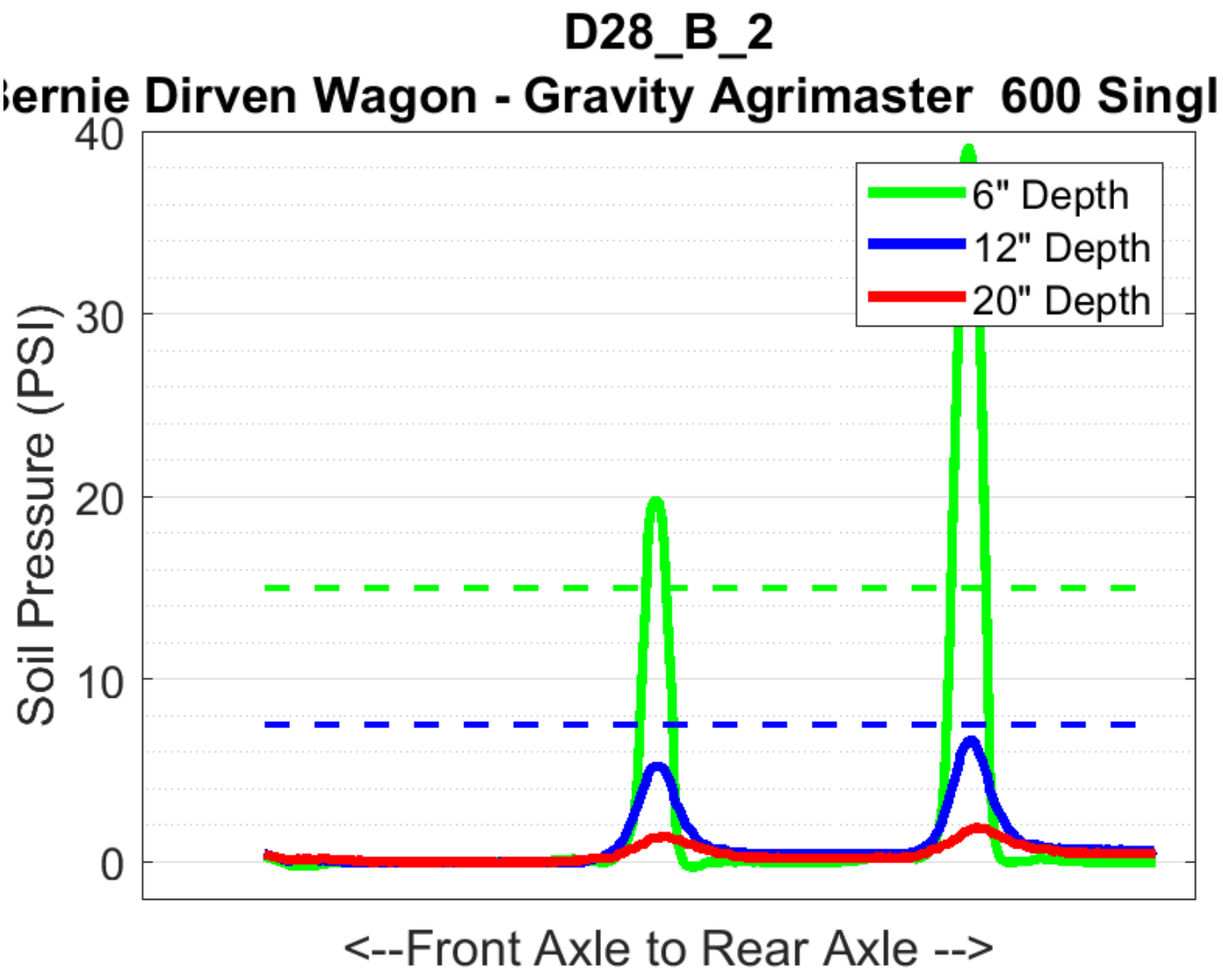
Exh: D28

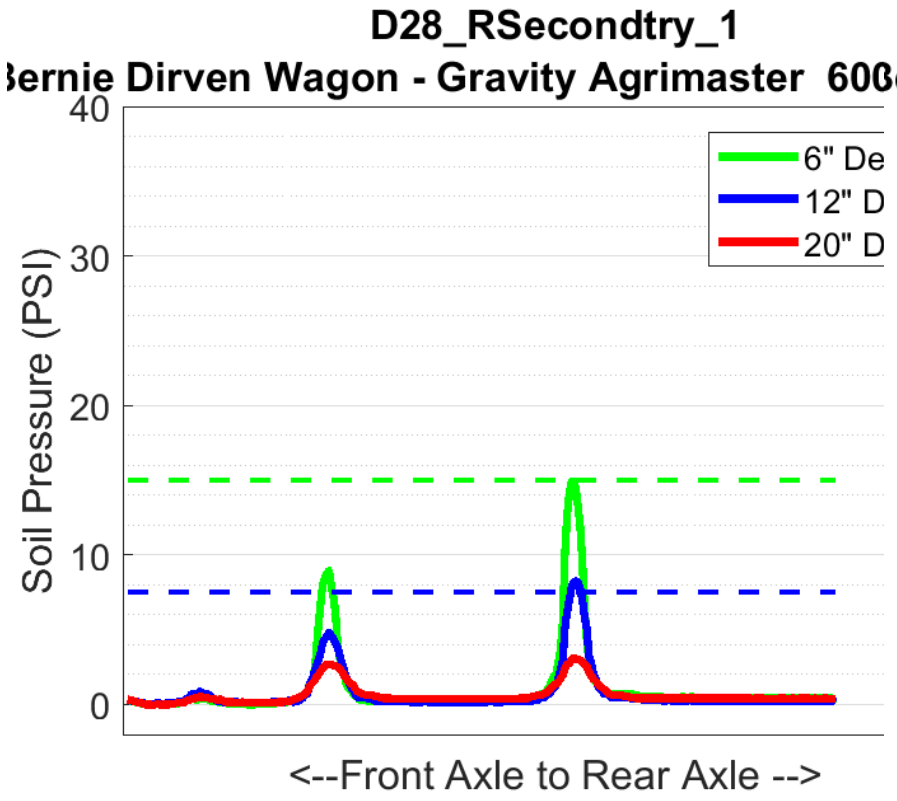

35 PSI Front
12,400
550/60-22.5
10,640
550/60-22.5
46
PSI
Gravity Wagon
Horst Agrimaster
A600
41,720 lbs (19 T)
23
PSI
8,180
550/60-
22.5
10,500
550/60-22.5

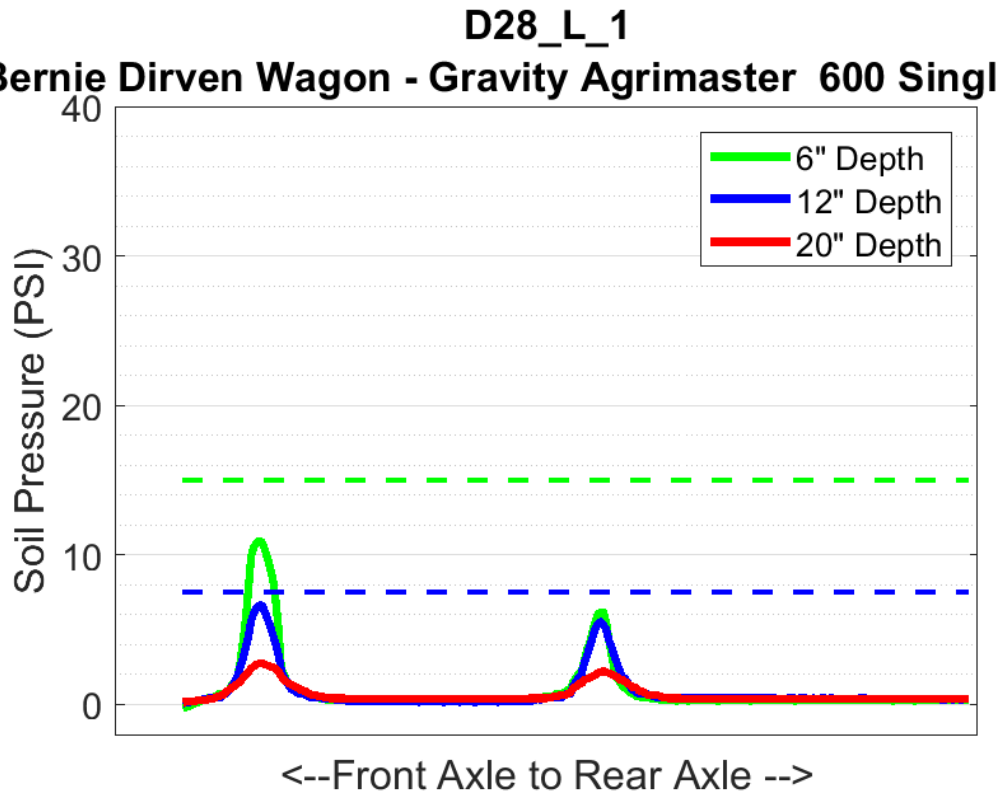

AgriMaster
A600


D28_A_2
ernie Dirven Wagon - Gravity Agrimaster 60
Soil Pressure (PSI)
40
30
20
10
0
6" De
12" D
20" D
<--Front Axle to Rear Axle -->


D28_Aagain_2
ernie Dirven Wagon - Gravity Agrimaster 600 Sing
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D28_B_2
ernie Dirven Wagon - Gravity Agrimaster 600 Singl
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D28_RSecondtry_1
ernie Dirven Wagon - Gravity Agrimaster 600
6" De
12" D
20" D
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->


D28_L_1
ernie Dirven Wagon - Gravity Agrimaster 600 Singl
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

Plot Comments – D28

- This wagon had some issues tracking straight so that both front and rear tires went over the sensors correctly.
- These tires are stamped “Flotation” on the sidewall, but by the tire size/detail (550/60-22.5) these are BIAS ply tires as designated by the “-”! Don’t be fooled by the marketing hype.
- The tire psi is not as excessive as would be expected with bias ply tires because of the large tire volume and axle weight combination, BUT;
- Significant compaction inducing stress was detected at the 6 and 12” depths, especially the 6”,whereas the 20” depth sensor detected very little stress because the overall axel weight is not excessive.


W1+2
46
28
A+B


AgriMaster
A600


W1+2
46
28
A+B


105/65R32
25 PSI


psi
20
15
10
5
0
TIME

2019 Dundas Soil and Crop Compaction Event

Exhibit: D29
CIH Maxxium 120 w 480s & Forage Box w Tandem 445s vs 600s


Warning Push For Em
MEYER
MEYER
MEYER
CASE IH
120
89
L+R

Exh: D29

50 PSI Left

6,540
445/65R22.5

6,980
445/65R22.5

Forage Trailer
Meyer RTX 220
27,200 lbs (12.3 T)

6,680
600/50-22.5

7,000
600/50-22.5

30 PSI Right

17 PSI Rear

5,440
480/80R42

1,980
380/85R30

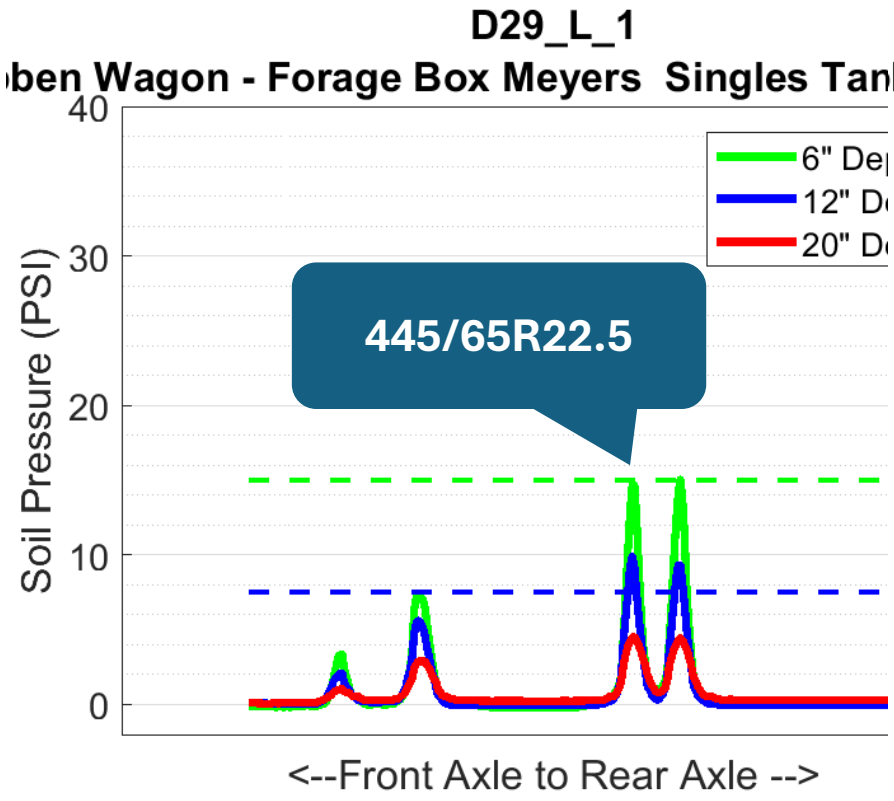
CIH Maxxium 120
15,040 lbs (6.8 T)

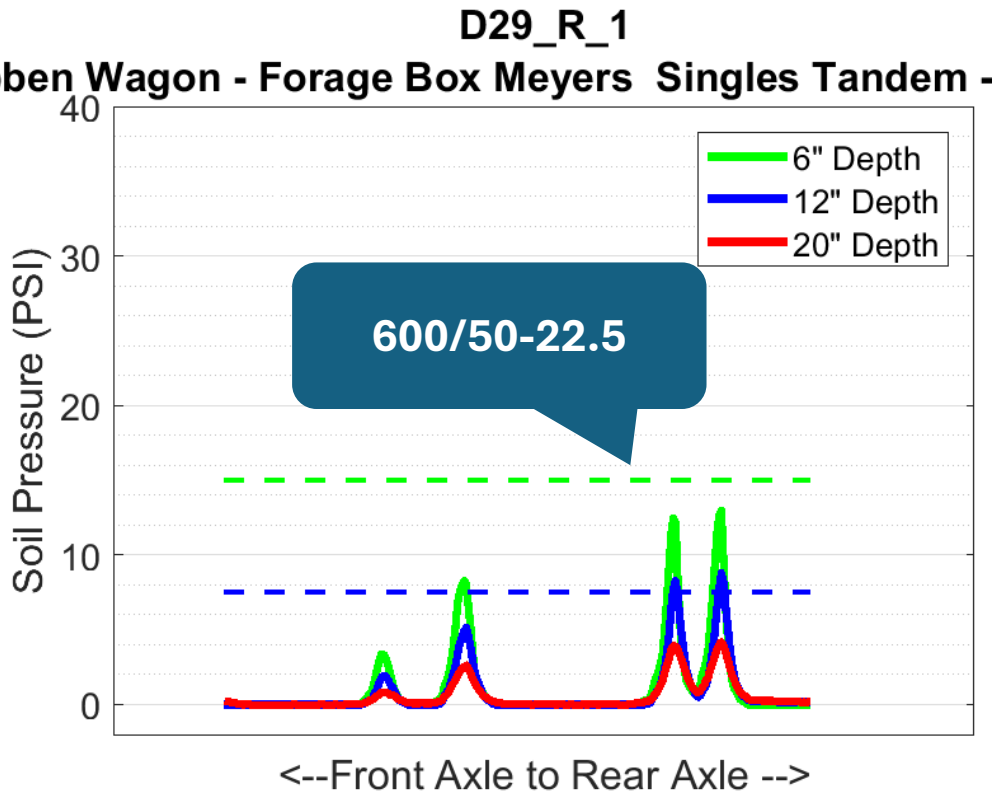
5,540
480/80R42

2,080
380/85R30

9 PSI Front

NOTE: Trailer NOT Fully Loaded!


D29_L_1
ben Wagon - Forage Box Meyers Singles Tan
6" De
12" D
20" D
445/65R22.5
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D29_R_1
ben Wagon - Forage Box Meyers Singles Tandem -
6" Depth
12" Depth
20" Depth
600/50-22.5
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D29

- These plots show two types of tires, narrower radial vs wider bias
- The plot D29_R_1 shows a slight reduction in stress with a slightly larger tire despite it being a bias, but its size for the less than full load meant a lower recommended PSI.
- Size does matter! But the combination of size, tire type (VF>IF>Radial>>>Bias), and PSI means there are some variations in the “rules”. If the trailer had been full we would assume the Radial would have out performed the Bias tire.
- Stress at 20 inches was comparable.


29
L+R
CASE
120


CASE
120


29
L+R
CASE

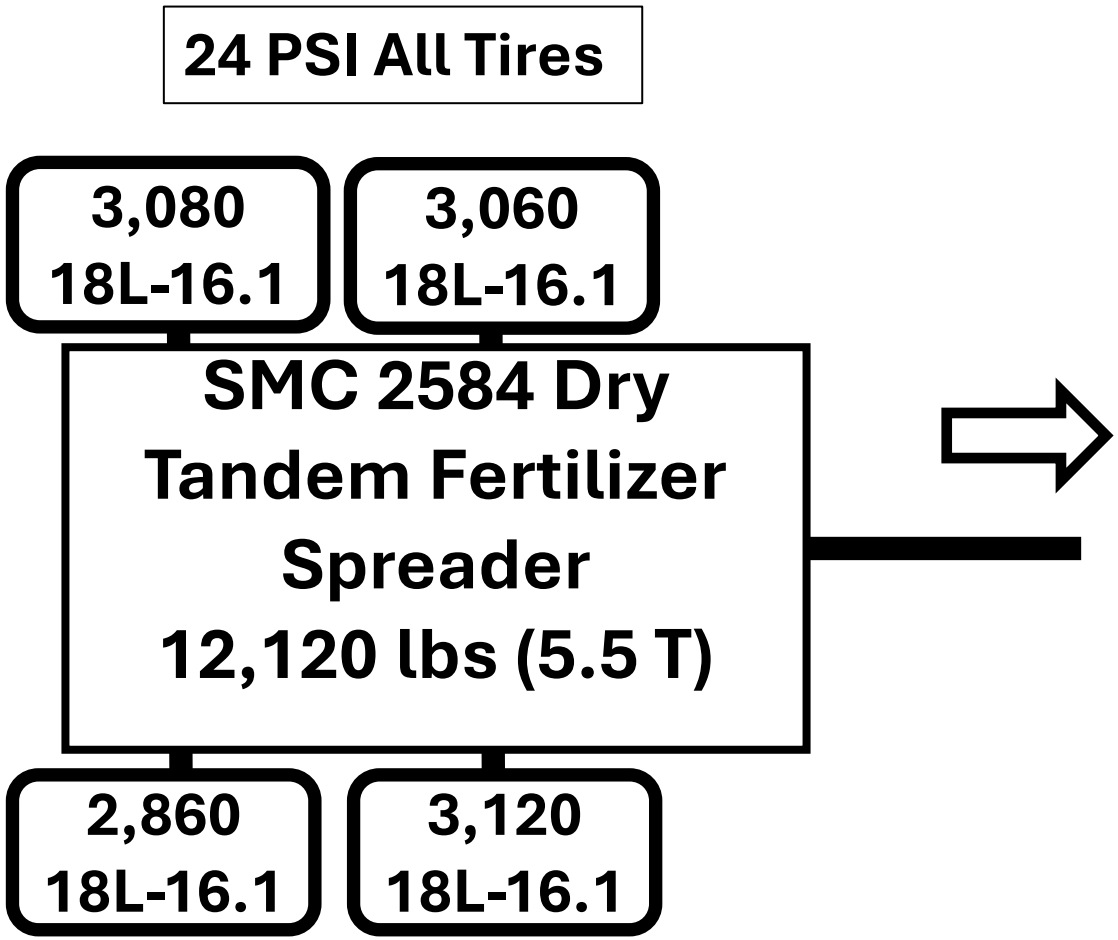
2019 Dundas Soil and Crop Compaction Event

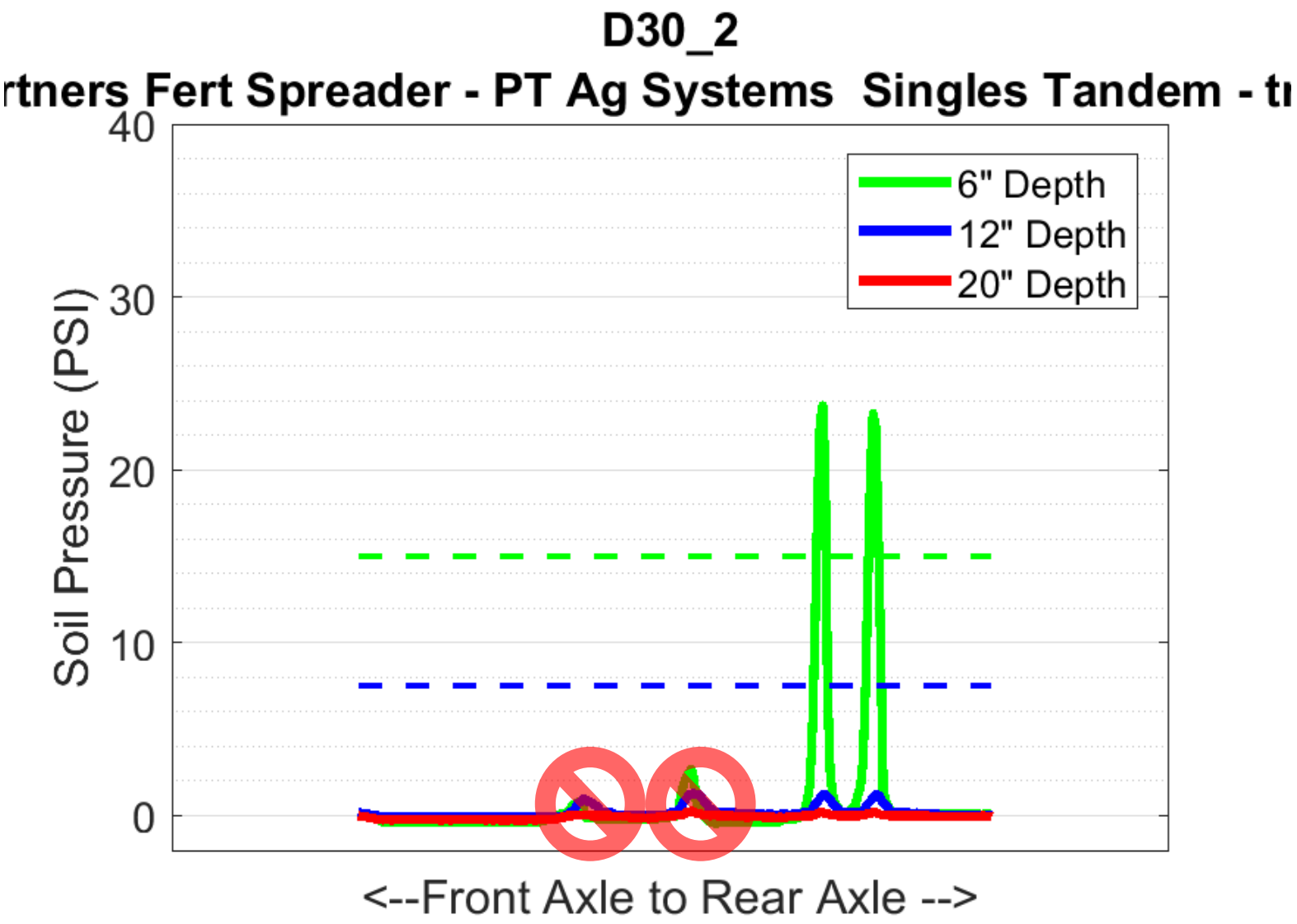
Exhibit: D30
SMC 2584 PT Tandem Dry Fertilizer Spinner Spreader w 18L Bias


Agri-Partners
Crop Centre Limited - Winchester
26 26
30
MAXIMUM PAYLOAD
8 TON
50 FT. SPREAD
CAUTION
CAUTION
Agri-Partners
SMC
2584

Exh: D30


Agri-Partners
26 26
30
Agri-Partners


24 PSI All Tires
3,080
18L-16.1
3,060
18L-16.1
SMC 2584 Dry
Tandem Fertilizer
Spreader
12,120 lbs (5.5 T)
2,860
18L-16.1
3,120
18L-16.1


D30_2
rtners Fert Spreader - PT Ag Systems Singles Tandem - tı
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D30

- This plot shows that even at a reasonable 26psi, a bias ply tire with a round profile can put high stress in the topsoil, especially near the surface.
- The spreader was not full and had it been full we likely would have seen more stress at both the 12” and 20” sensors.
- Avoid bias ply tires on any implement that carries weight in the field
- The tractor tires did not line up with the spreader tires so no sensing was recorded for it.


CASE
L750
125


26
SMC
2584
Agri-Partners


26
SMC
2584
Agri-Partners


CASE
L750
125

2019 Dundas Soil and Crop Compaction Event

Exhibit: D31
Nuhn Quad-Steer 17000 Liquid Manure Spreader w 35.5s + Class Xeron 4500 Tractor w Single 600s


XERION
31
A+B
CLAAS
NORM

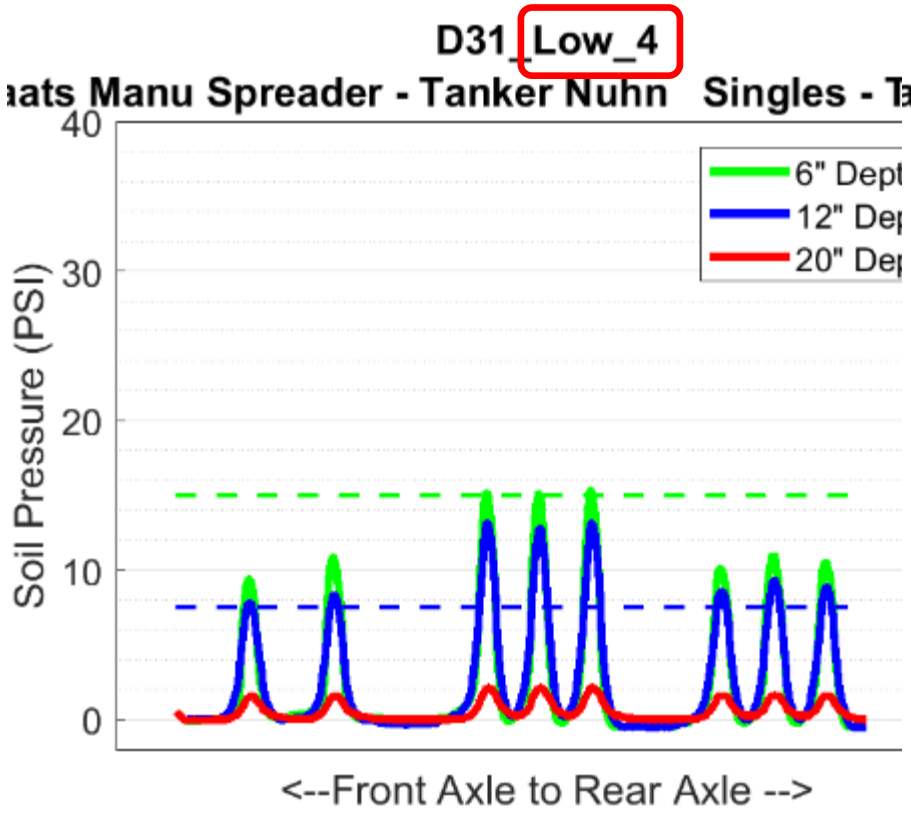
D31 A+B

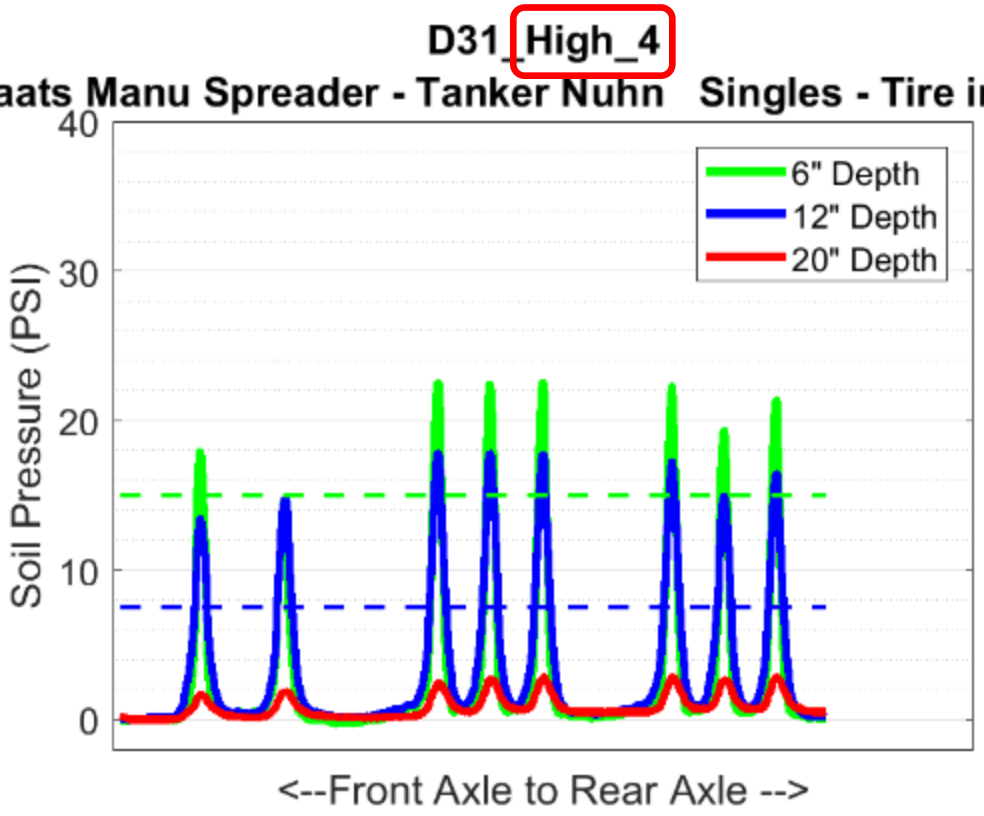
12,860	13,820	14,580	15,510	17,700	17,860	12,780 600/60R42		12,100 600/60R42
Tanker NUHN I7000 80,530 lbs (37 T)			Tanker NUHN I7000 103,100 lbs (47 T)			CLASS Xeron 4500 48,590 lbs (22 T)		
12,740	12,930	13,600	17,380	17,250	17,400	11,930 600/60R42		11,780 600/60R42

Spreader Tires: 35.5LR32 = 900/60R32

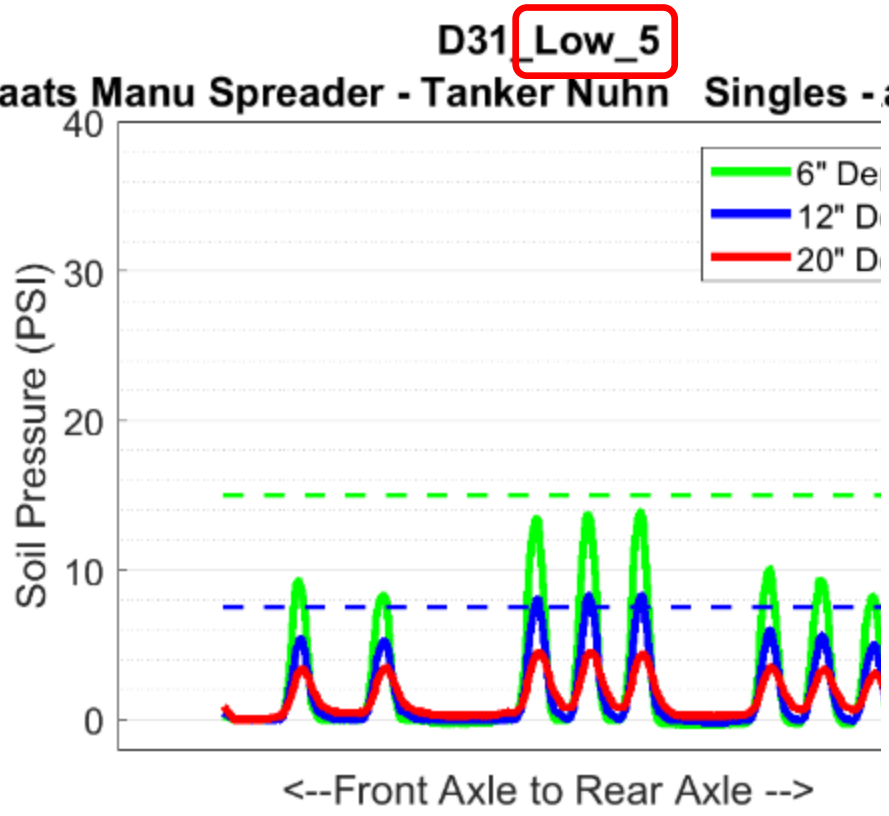
Equipped with CTIS

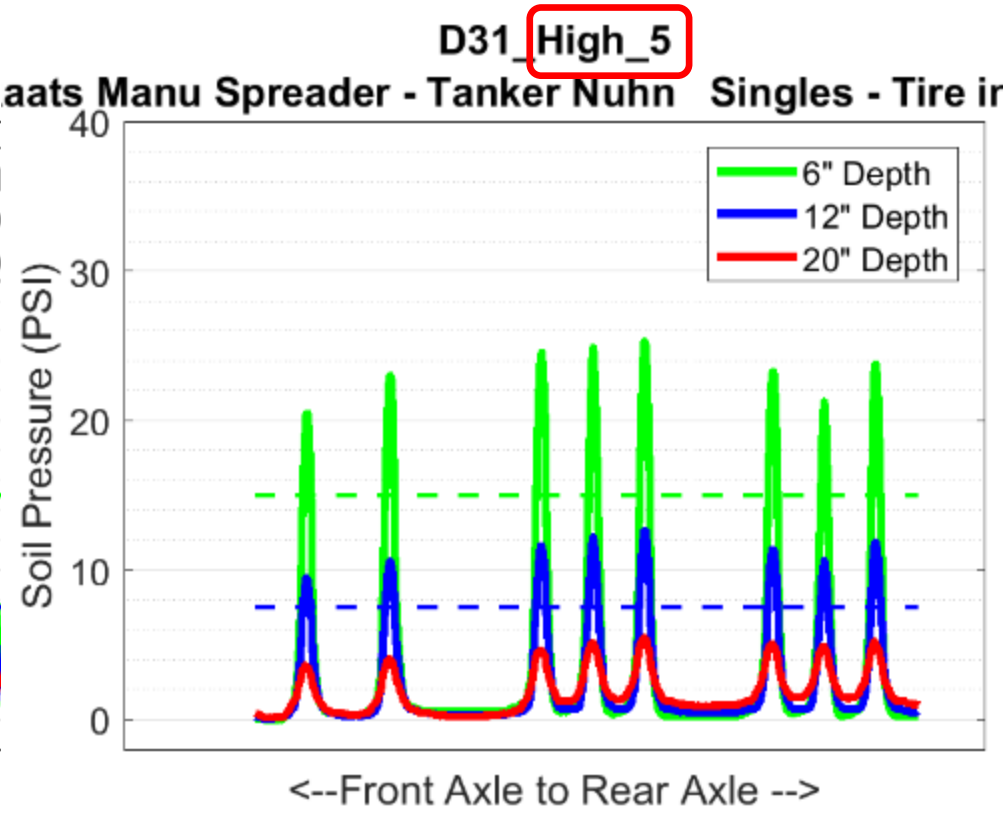
Graph 1


D31_Low_4
aats Manu Spreader - Tanker Nuhn Singles - T
6" Dept
12" Dep
20" Dep
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

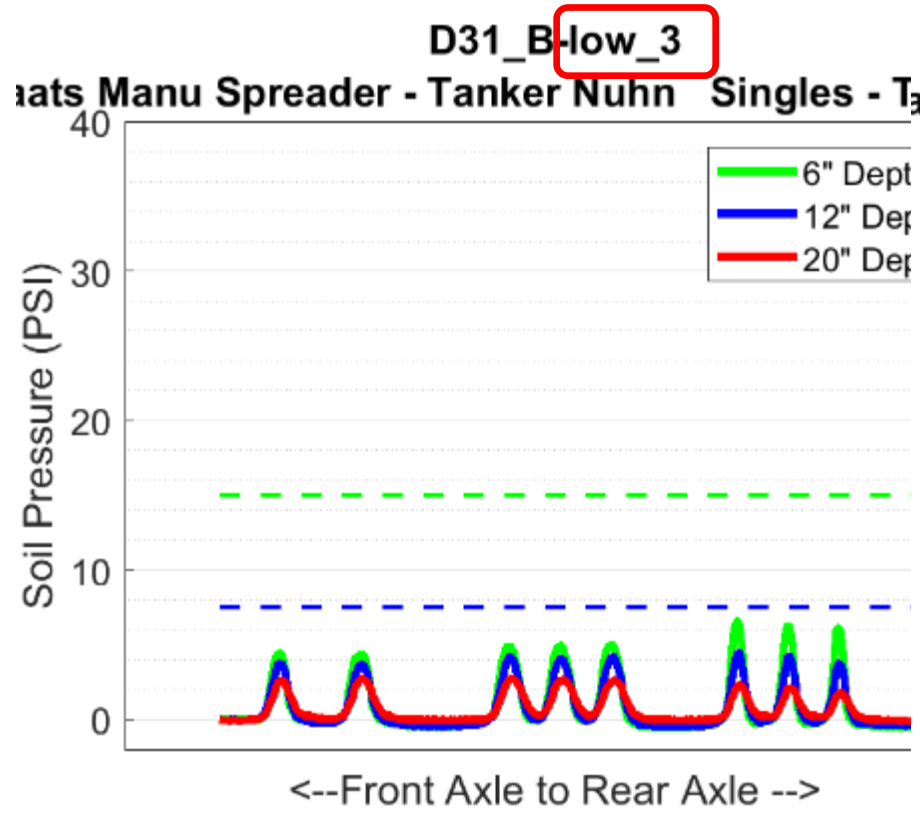

D31_High_4
aats Manu Spreader - Tanker Nuhn Singles - Tire in
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

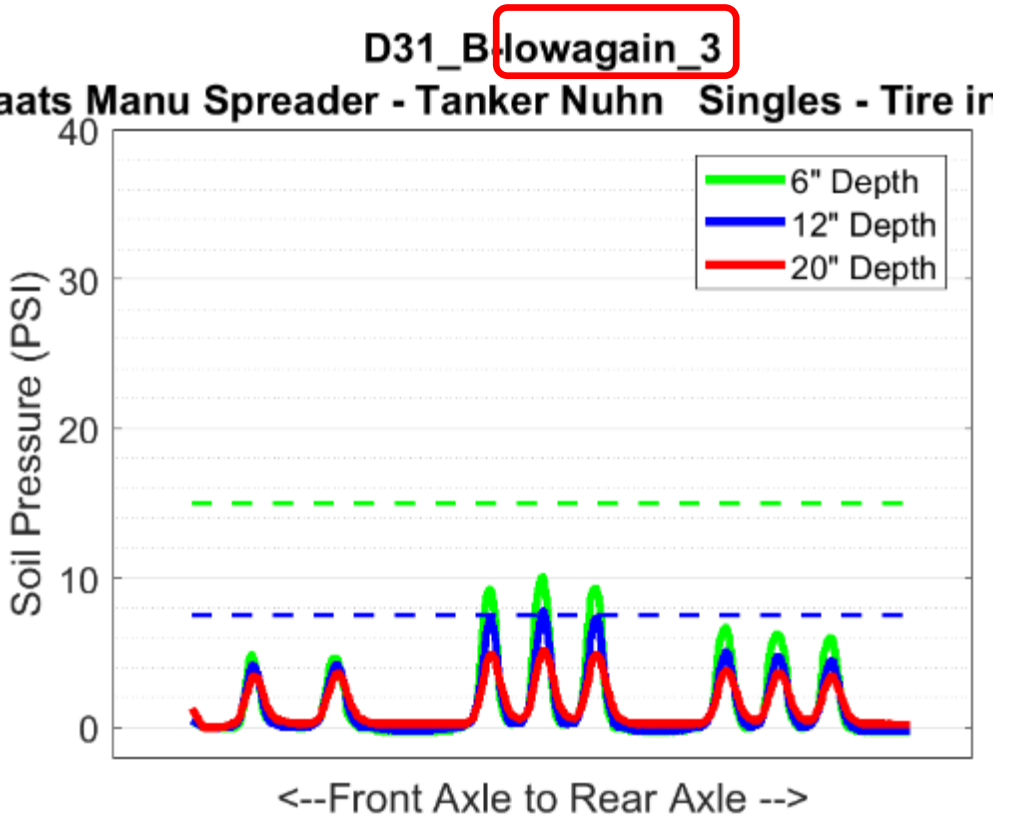
Graph 2


D31_Low_5
aats Manu Spreader - Tanker Nuhn Singles -
6" De
12" D
20" D
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

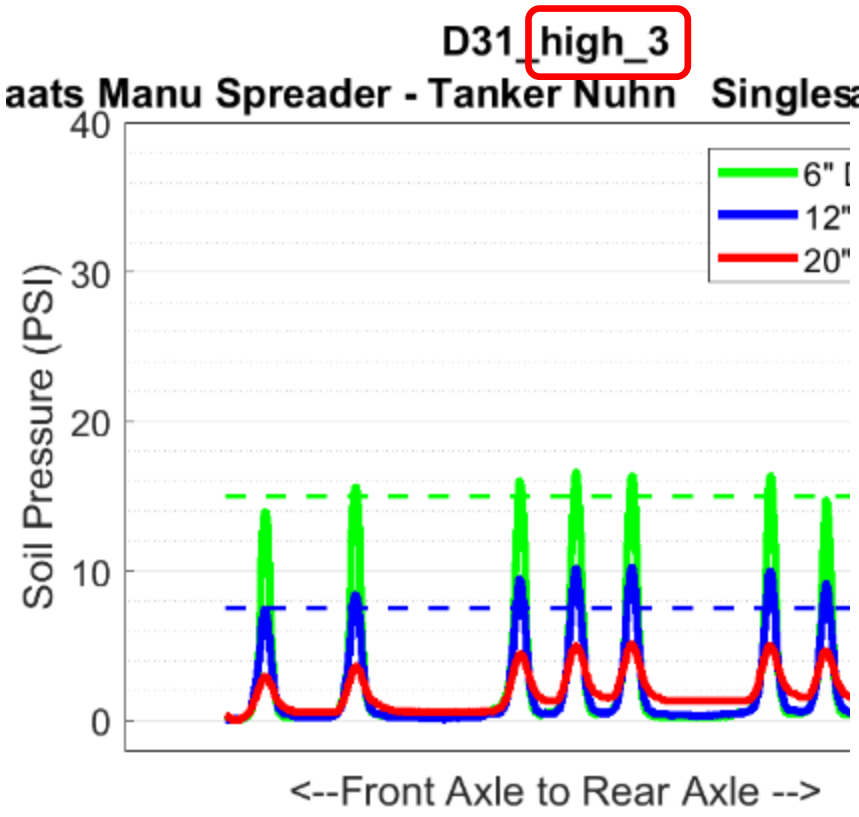

D31_High_5
aats Manu Spreader - Tanker Nuhn Singles - Tire ir
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

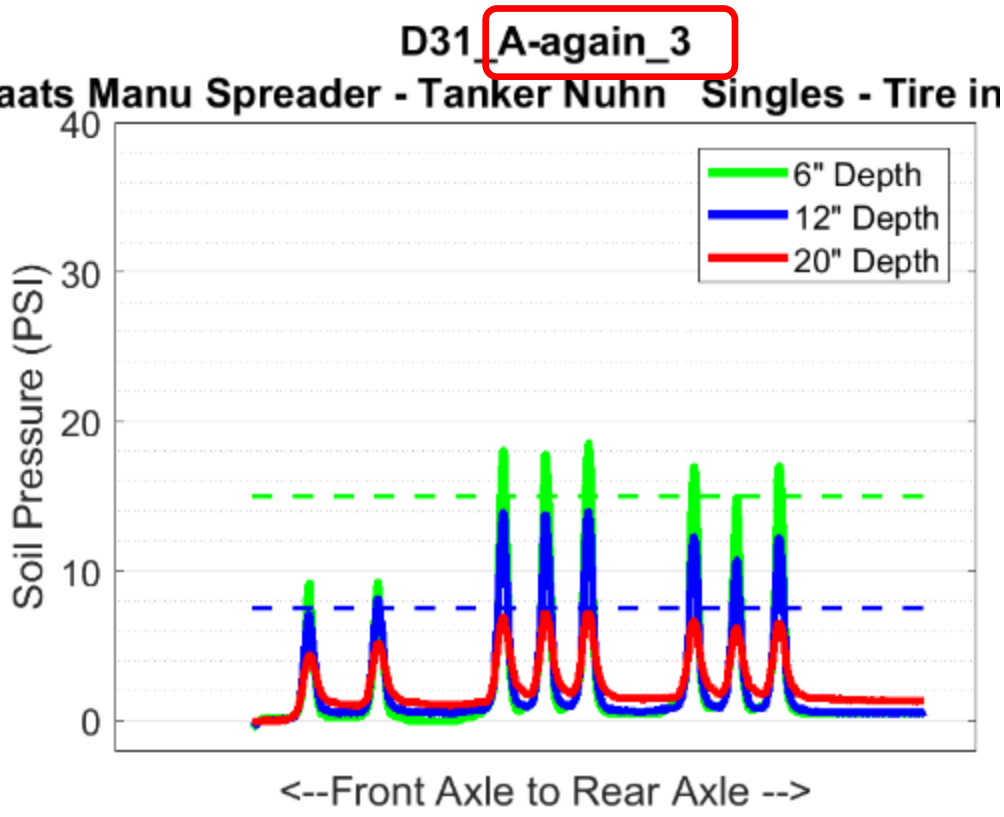
Graph 3


D31_Blow_3
aats Manu Spreader - Tanker Nuhn Singles - T
6" Dept
12" Dep
20" Dep
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->


D31_Blowagain_3
aats Manu Spreader - Tanker Nuhn Singles - Tire ir
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

Graph 4


D31_high_3
aats Manu Spreader - Tanker Nuhn Singles
Soil Pressure (PSI)
40
30
20
10
0
6" D
12"
20"
<--Front Axle to Rear Axle -->


D31_A-again_3
aats Manu Spreader - Tanker Nuhn Singles - Tire in
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D31

- Similar results to other CTIS systems
- Comparing the high pressure tires to the low pressure tires shows reduction of stress at 6 and 12 inches showing that the larger footprint at low PSI is distributing the weight more at those depths.
- Gr1 shows low vs high PSI on thurs am & Gr2 thurs pm which is after rain on the wed night.
- Gr 3 (Low) and 4 (High) show the testing issue with our method where even with big tires you can get different readings because the tires tracking slightly differently as they cross the sensors between passes.
- The heavy weight still creates high stress at 20 inches regardless of pressure
- This configuration really shows the benefits of CTIS even for the relatively low weight tractor, but big time for tankers.


CLAAS
31
A+B


12100
35 PSI Road
12 PSI


17380
42 PSI R.
16PSI F


16 PSI F
16PSI F


13826
10 PSI F
41 PSI R

2019 Dundas Soil and Crop Compaction Event

Exhibit: D32
JD 9520R Articulated Tractor w Dualled IF 710s


32
9520R
JOHN DEERE

Exh: D32

5,320
6 PSI

6,940
10 PSI

5,640
6 PSI

8,640
12 PSI

JD 9520 R Articulated
51,720 lbs (24 T)

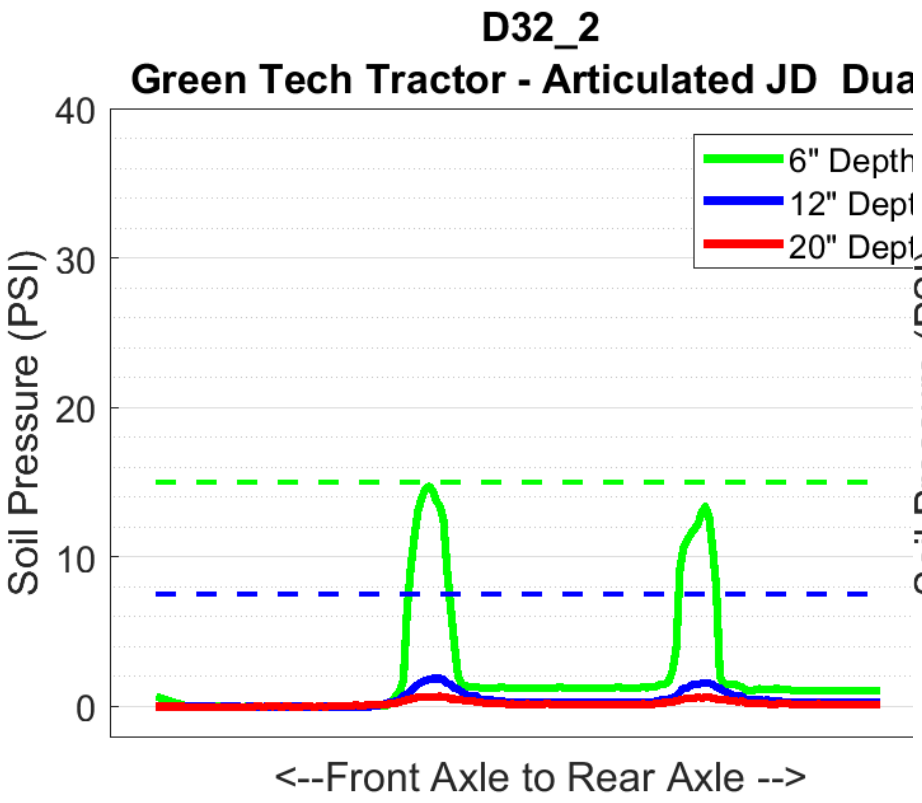
5,900
6 PSI

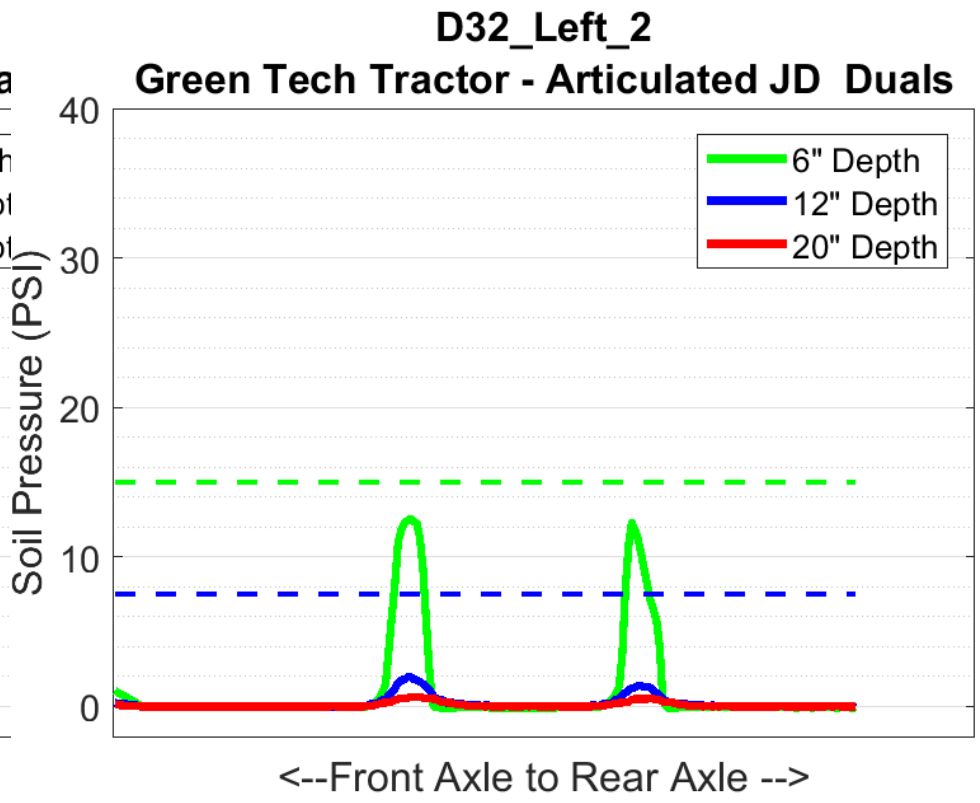
8,120
12 PSI

4,620
6 PSI

6,540
10 PSi

Tires - Dual IF710/70 R42


D32_2
Green Tech Tractor - Articulated JD Dua
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

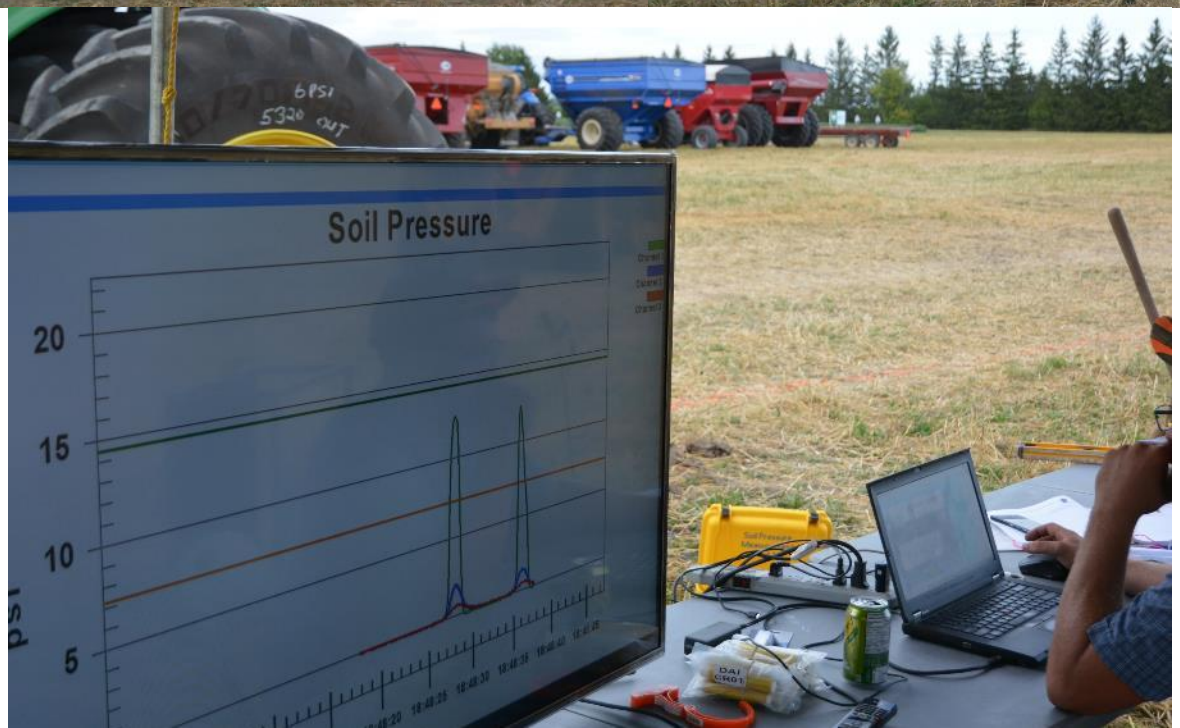

D32_Left_2
Green Tech Tractor - Articulated JD Duals
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
40
30
20
10
0
<--Front Axle to Rear Axle -->

Plot Comments – D32

- This configuration with IF 710 Duals is providing lots of contact with the soil to spread the weight.
- The target should be 5000 lbs maximum tire weight at less than 15 psi
- This configuration is expensive so people have to weigh the pros and cons of striving for these parameters but it shows that even big equipment can be configured to reduce the threat of compaction.
- Note that all the response is detected at the 6” depth and although we would like less, stress deeper is more of a problem.
- This configuration results in low concern for compaction under these soil conditions at 12 and 20” depth.
- The testing of this exhibit was before the rainfall.


32


JOHN DEERE
9520R


Soil Pressure
20
15
10
5
psi

2019 Dundas Soil and Crop Compaction Event

Unit D33+D3

CaseIH STX420 Articulated Narrow Track Tractor + Unverferth 1110 Tracked Grain Buggy


3
CASE
420
CASE

Exh: D33 + D3

38,000
Track

Grain Buggy
Unverferth 1110
74,150 lbs
(33.6T)

36,150
Track

16,300
Track

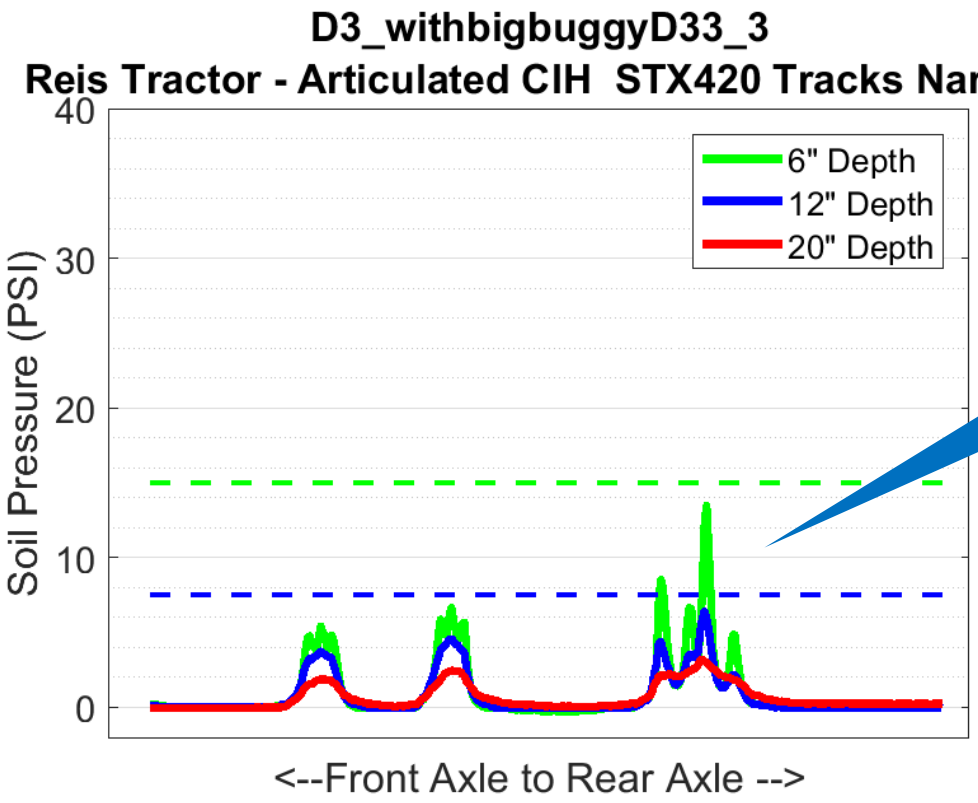
61,810 lbs
(28T)

16,030
Track

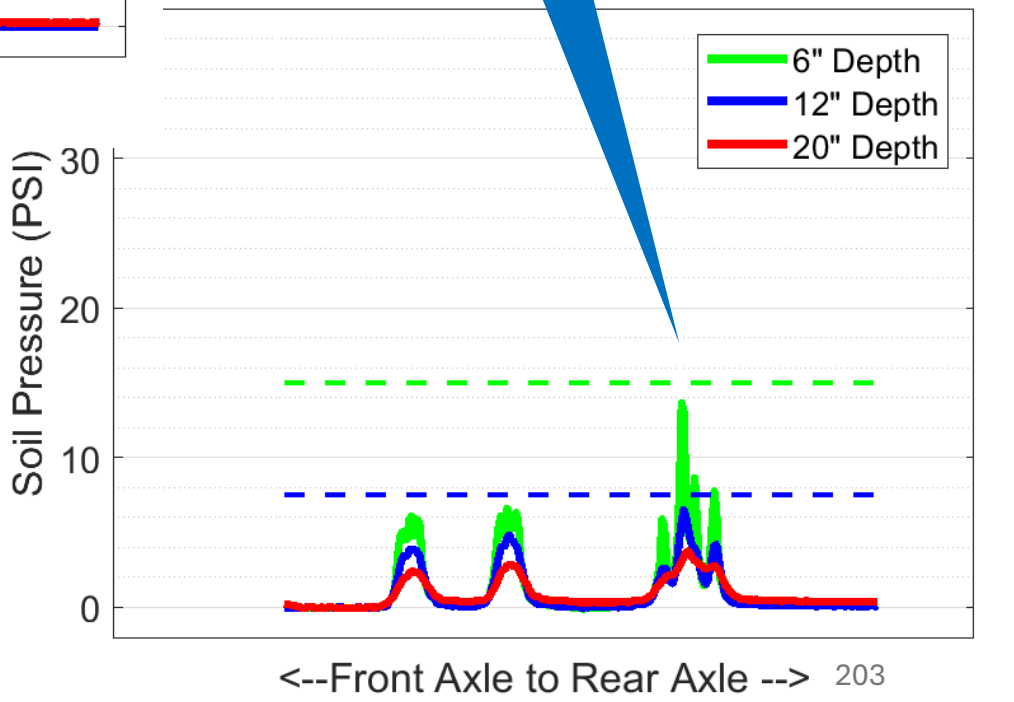
15,080
Track

CaseIH
420
Quadtrac

14,440
Track


D3_withbigbuggyD33_3
Reis Tractor - Articulated CIH STX420 Tracks Narr
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
40
<--Front Axle to Rear Axle -->

Grain Buggy


D3_withbigbug D33leftagain_3
actor - Articulated STX420 Tracks Narr
6" Depth
12" Depth
20" Depth
Soil Pressure (PSI)
0
10
20
30
<--Front Axle to Rear Axle -->

Plot Comments – D33 + D3

- This buggy is heavy, higher stress in the lower depths when compared to lighter equipment.
- Heavy weights that drive soil compaction deeper due to sheer gross weight require more expensive and exhaustive recovery, even with tracks we are seeing significant weight being transferred deeper into the soil
- The variation in the green curve on both plots may be due to lug spacing and roller contact.


DTRAC
1720
10480
2603


1110

2019 Dundas Soil and Crop Compaction Event

Exhibit: D34 + D4

J&M 812X Grain Cart w 1050 Singles + NH T8.380 LSW 1000 Singles Row Crop Tractor


4
34

Exh: D 34

26,340
1050/50R32
36 PSI

8,640
LSW
1000/45R46

7,920
LSW
1000/40R32

J & M 812X
Grain Cart
53,260 lbs
(24T)

NH T8.380
33,180 lbs
(15T)

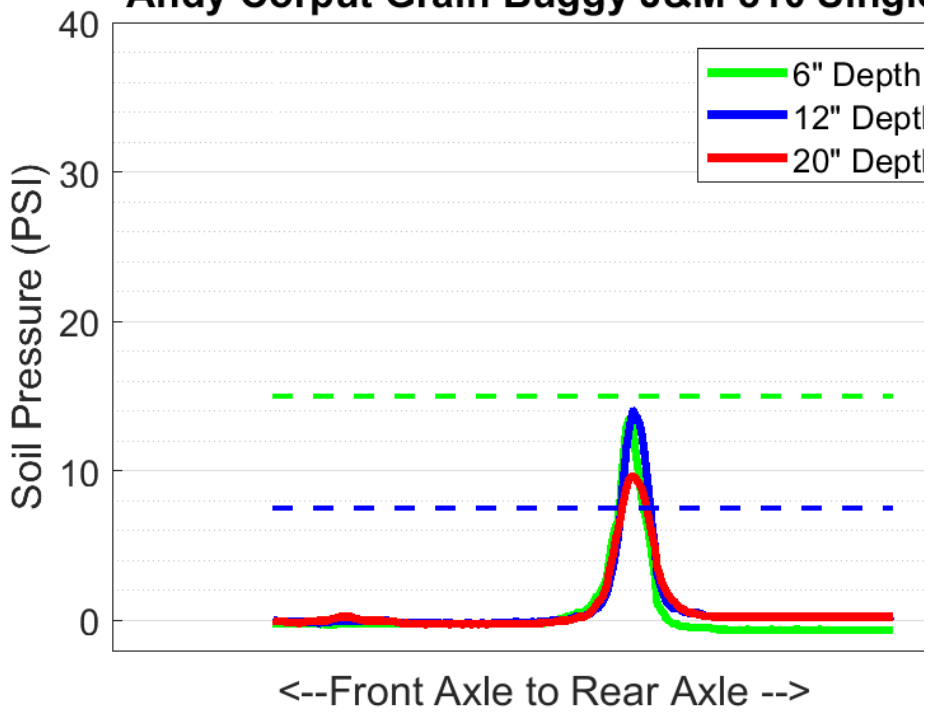
8,980
LSW
1000/45R46

7,640
LSW
1000/40R32

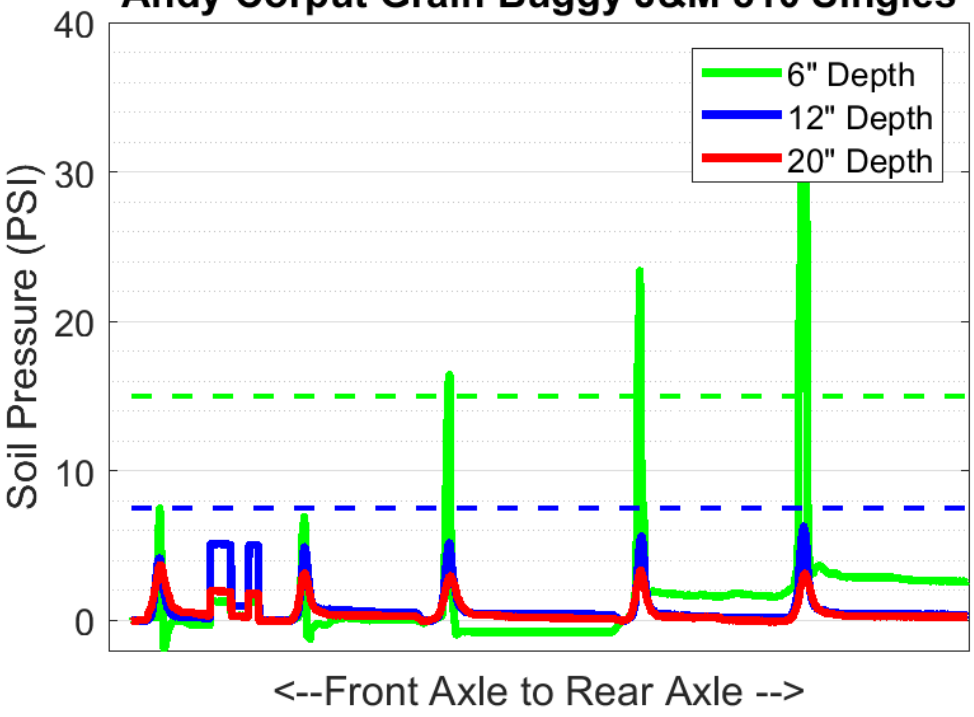
26,920
1050/50R32
36 PSI

11 PSI tractor

1050s


D34_1
Andy Corput Grain Buggy J&M 810 Singl
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

1050s


D34_lastpeakonplot_2
Andy Corput Grain Buggy J&M 810 Singles
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D34

- Very heavy single axle buggy
- Generates high stress as depth
- Based on the axle weight this buggy should have more tire on it or not be filled when soil conditions are wet


NEW HOLLAND


J&M


812X
J&M

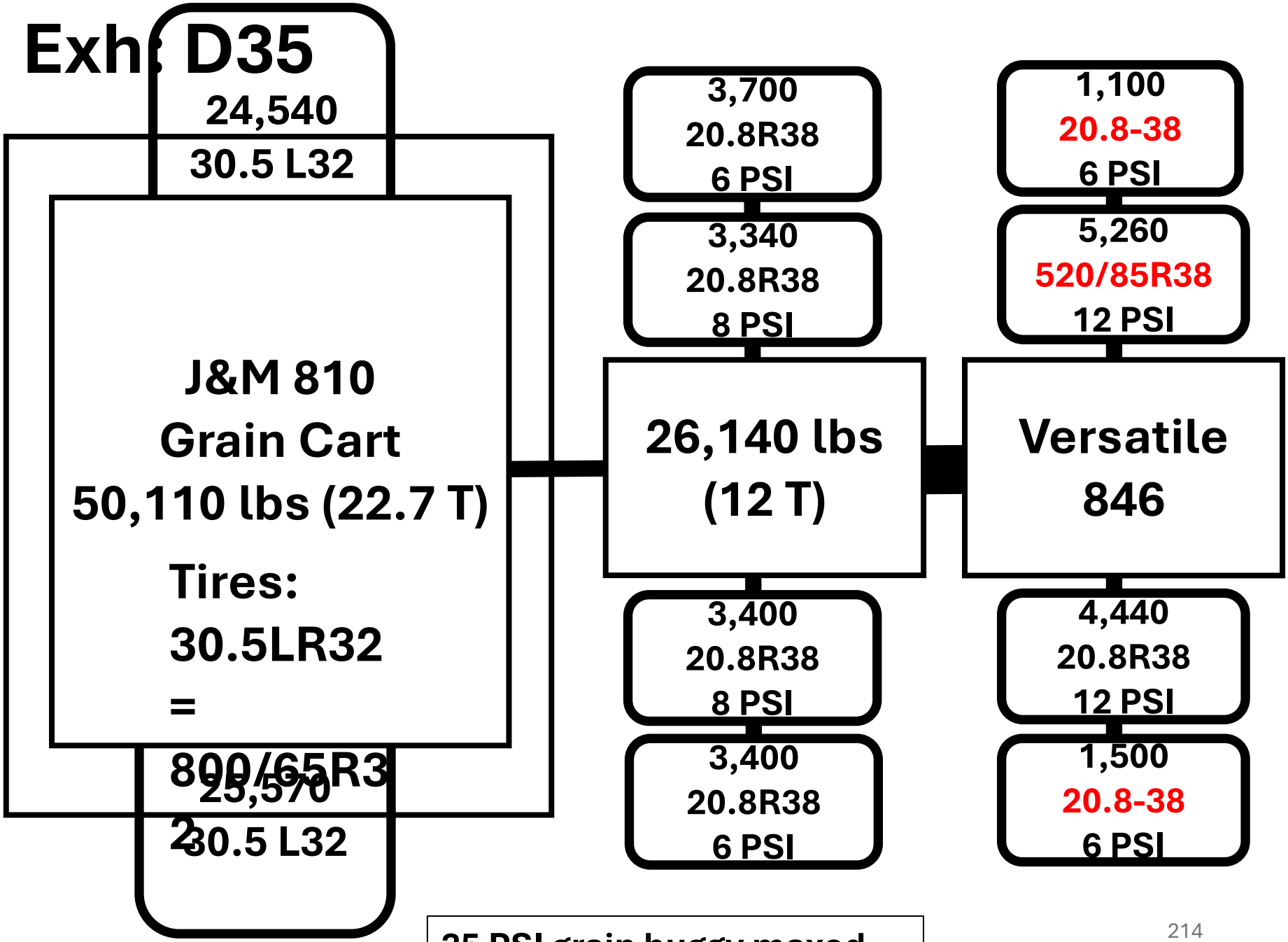

NEW HOLLAND

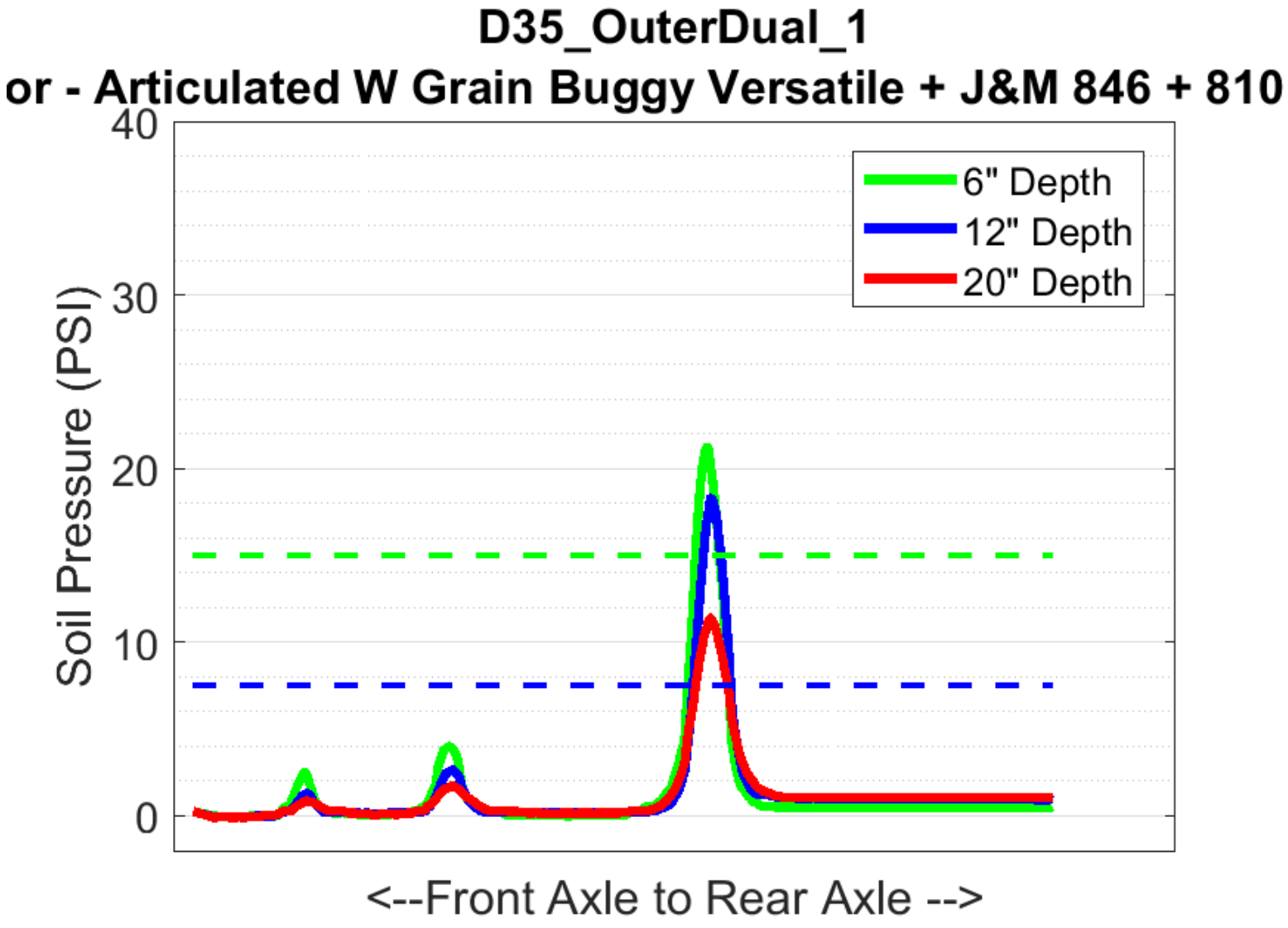
2019 Dundas Soil and Crop Compaction Event

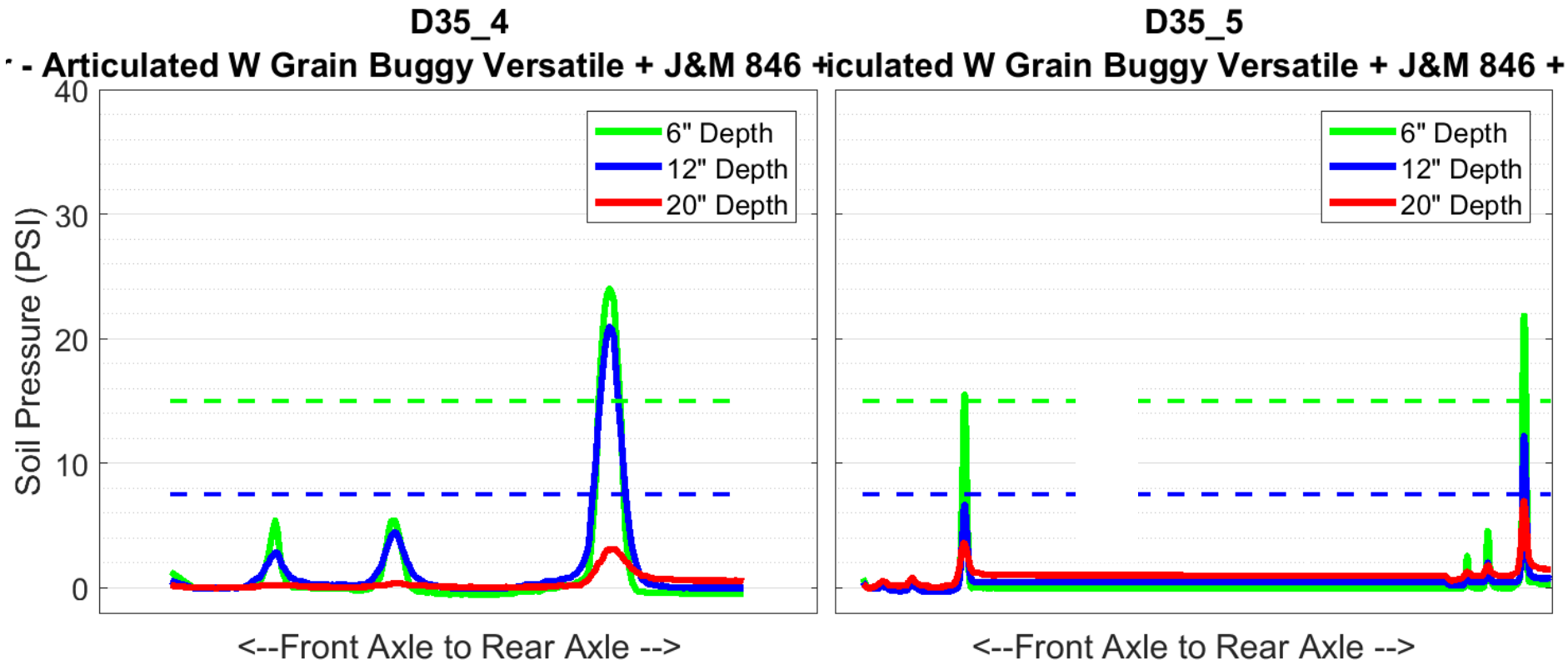
Exhibit: D35

J&M 810 Grain Cart w 30.5L32 + Versatile 846 Dualled Articulated Tractor w 20.8R32


J&M
www.jm-inc.com
946


Exh: D35
24,540
30.5 L32
J&M 810
Grain Cart
50,110 lbs (22.7 T)
Tires:
30.5LR32
=
800/65R32
25,570
30.5 L32
3,700
20.8R38
6 PSI
3,340
20.8R38
8 PSI
26,140 lbs
(12 T)
3,400
20.8R38
8 PSI
3,400
20.8R38
6 PSI
1,100
20.8-38
6 PSI
5,260
520/85R38
12 PSI
Versatile
846
4,440
20.8R38
12 PSI
1,500
20.8-38
6 PSI
35 PSI grain buggy maxed


D35_OuterDual_1
or - Articulated W Grain Buggy Versatile + J&M 846 + 810
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D35_4
- Articulated W Grain Buggy Versatile + J&M 846 +
D35_5
iculated W Grain Buggy Versatile + J&M 846 +
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->
<--Front Axle to Rear Axle -->

Plot Comments – D35

- High axle weight on the grain buggy creating a high stress in the entire soil profile.
- Note that the tractor is well configured in terms of compaction avoidance under these soil conditions.
- This is the stark example where single axle grain buggy's are too heavy. The solution is more axles, tracks, or don't fill the buggy on each trip across the field.
- This is indicated by the stress detected at all depths of the sensors.
- This is one of the pieces of equipment where compaction at depth is a concern because of total weight.


J&M
X-Tended
846


810
X-Tended
J&M
wagantfarm.com


J&M
www.jm-inc.com
810
X-Tended
wagantfarm.com
wagantfarm.com


Soil Pressure
TIME

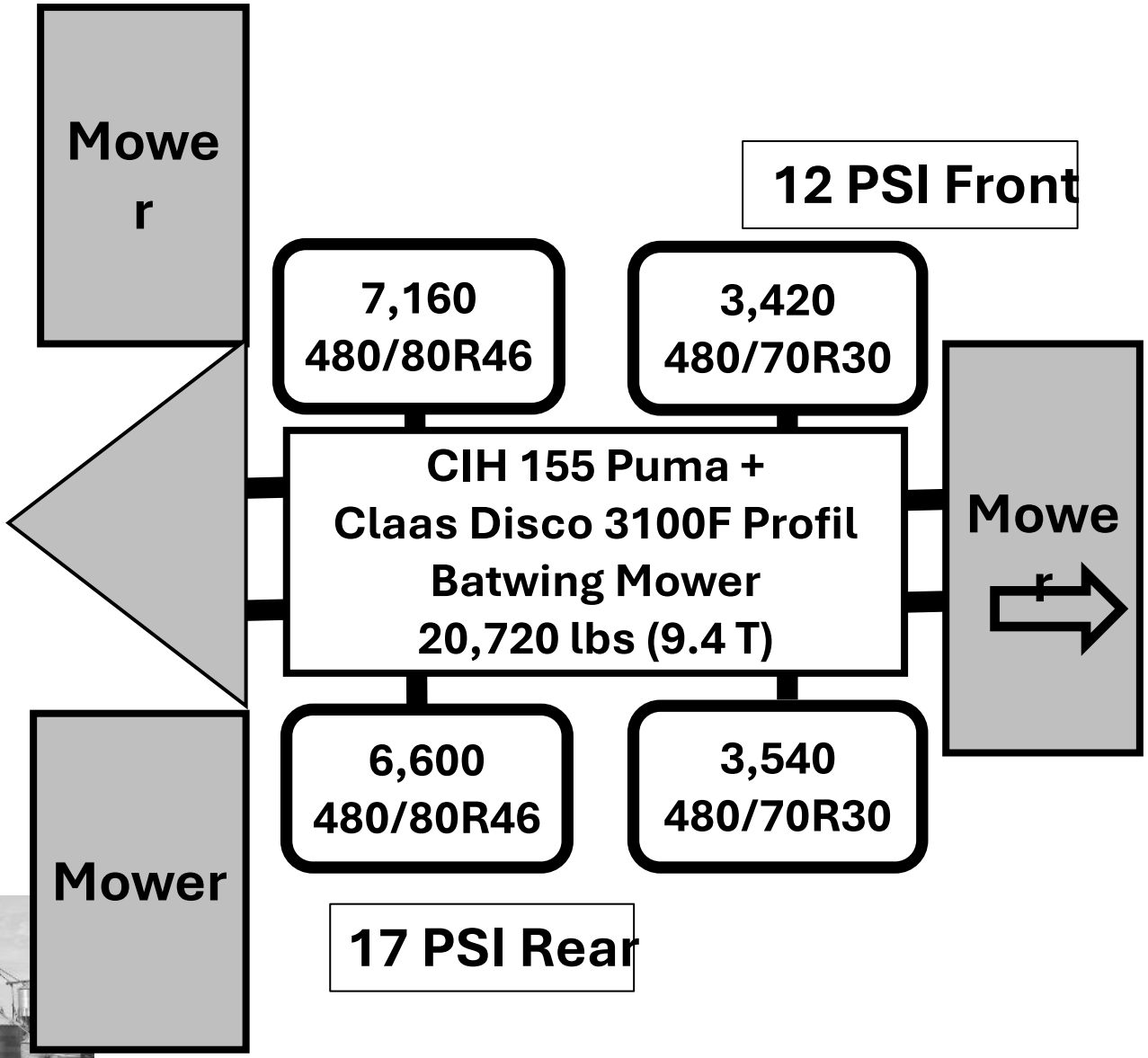
2019 Dundas Soil and Crop Compaction Event

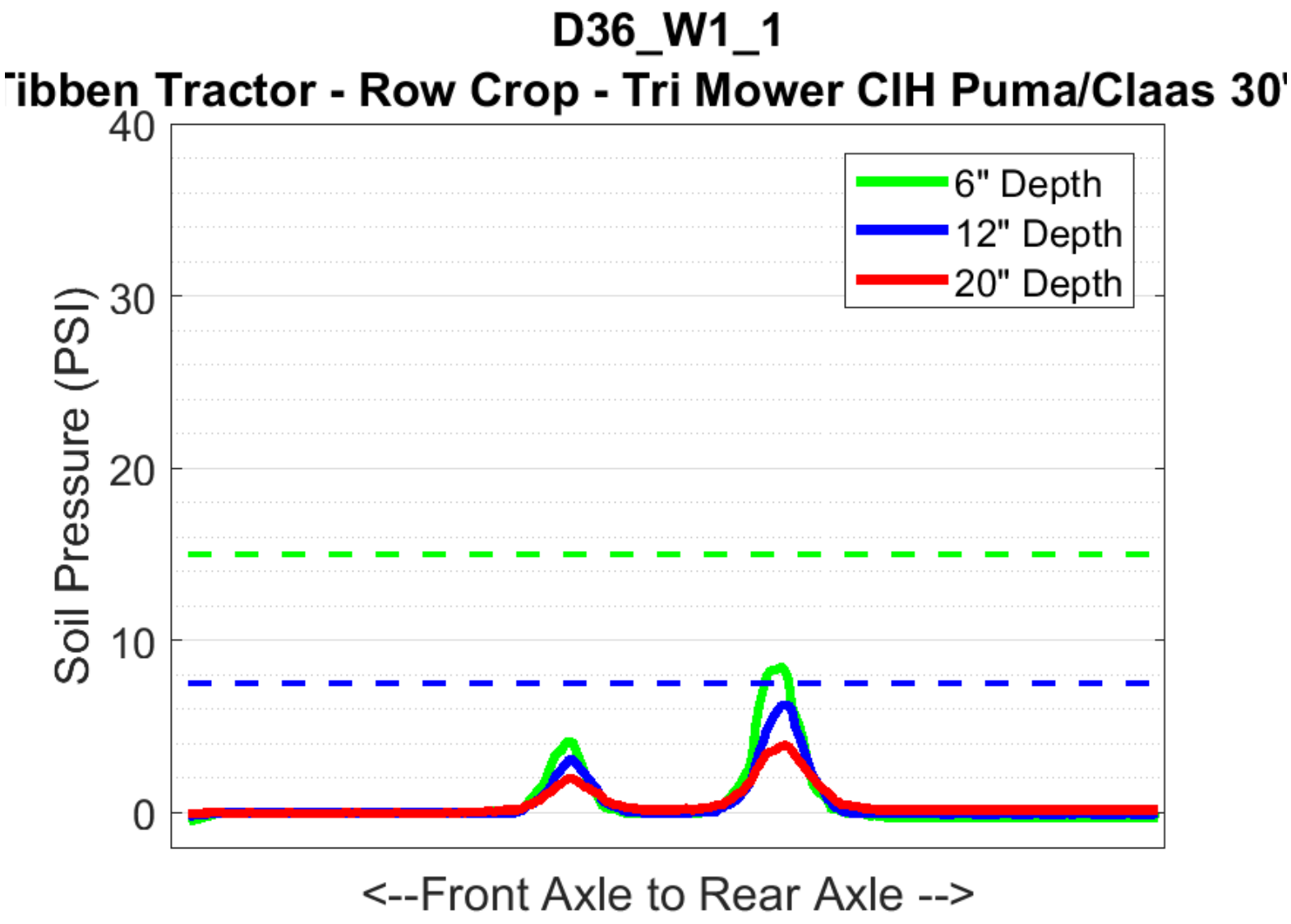
Exhibit: D36

Claas Disco 3100F Profil Batwing Mower + CaseIH 115 Puma Row Crop Tractor 480s


36
W1+2
DANGER

xh: D36


Mowe
r
12 PSI Front
7,160
480/80R46
3,420
480/70R30
CIH 155 Puma +
Claas Disco 3100F Profil
Batwing Mower
20,720 lbs (9.4 T)
Mowe
r
Mower
6,600
480/80R46
3,540
480/70R30
17 PSI Rear


D36_W1_1
Tibben Tractor - Row Crop - Tri Mower CIH Puma/Claas 30'
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D36

- This setup of radial tires is good for preventing compaction from this implement setup.
- PSI detected at all depths is below threshold.


CLAAS

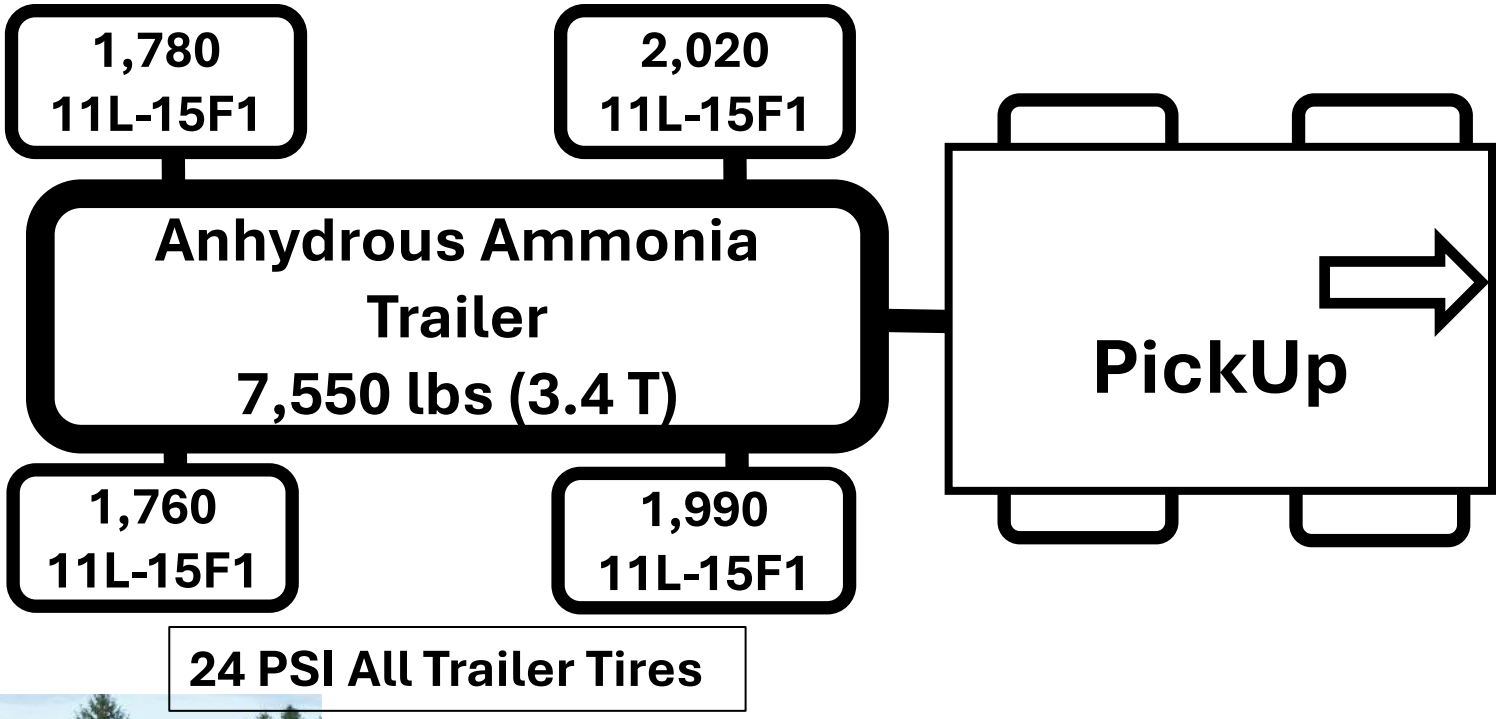

CLAAS

2019 Dundas Soil and Crop Compaction Event

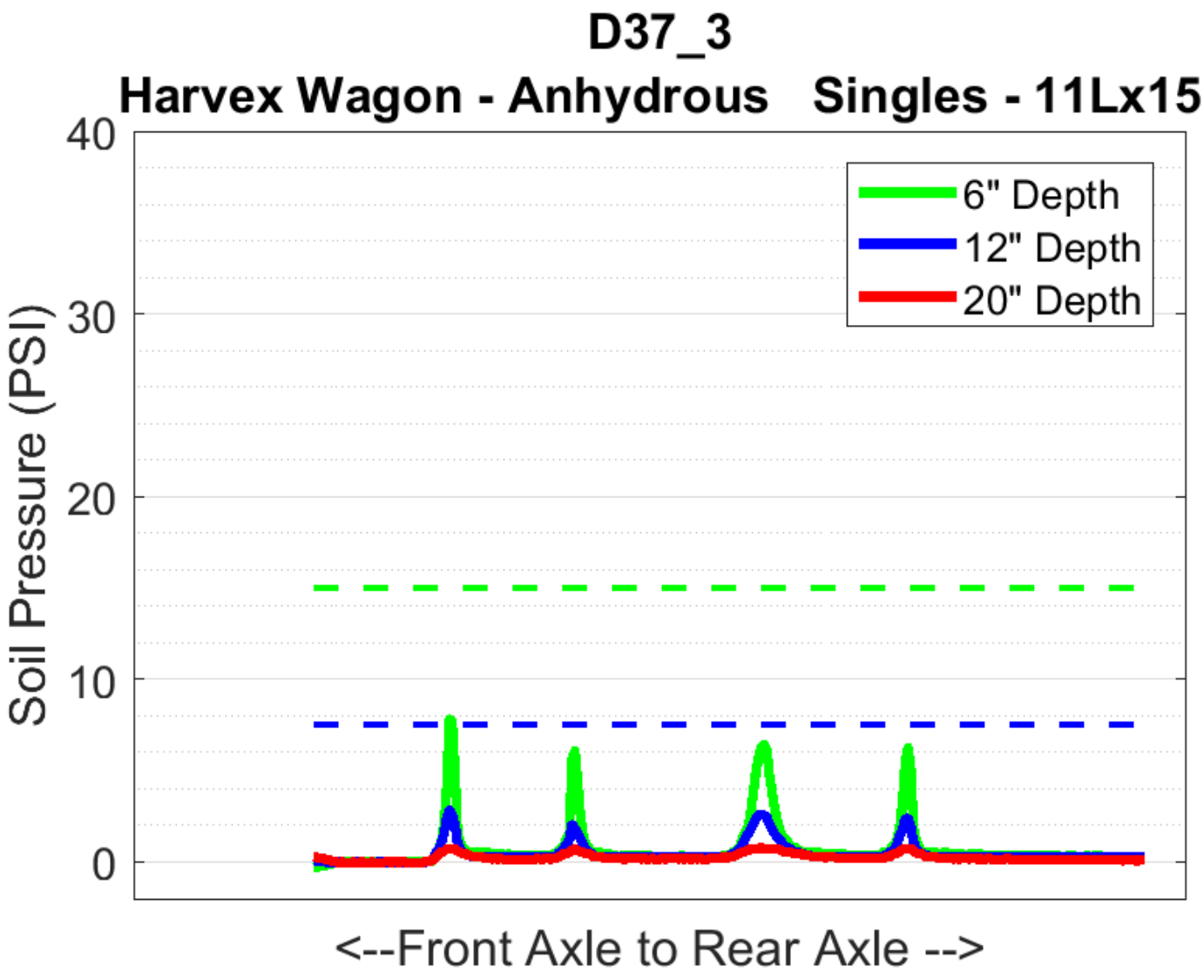
Exhibit: D37
Anhydrous Ammonia Field Tank w 11L-15


1005
2
1045
MAX TOWING SPEED 40KM/H
NQT
10/15 P 277
10/18 V 277
Harvex Agromart
ANHYDROUS AMMONIA
INHALATION HAZARD
1005
2

Exh: D37


1,780
11L-15F1
2,020
11L-15F1
Anhydrous Ammonia
Trailer
7,550 lbs (3.4 T)
PickUp
1,760
11L-15F1
1,990
11L-15F1
24 PSI All Trailer Tires

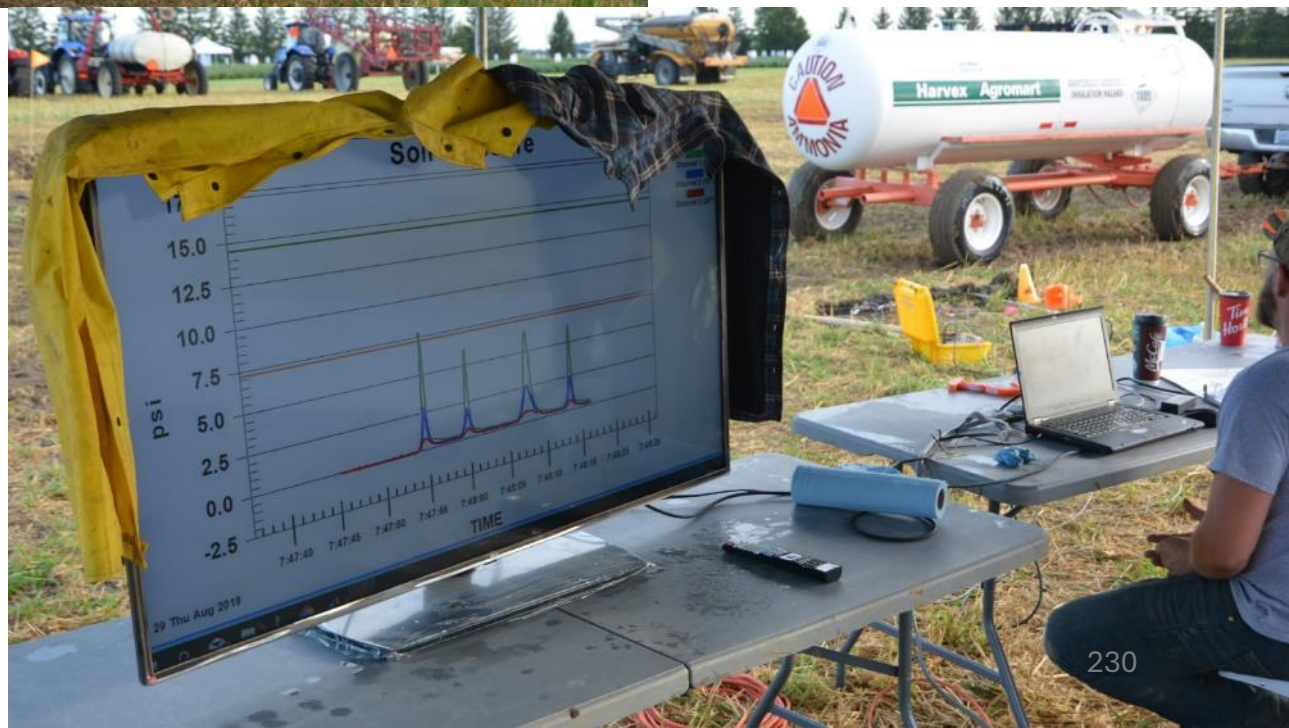

1045
Harvex Agromart


D37_3
Harvex Wagon - Anhydrous Singles - 11Lx15
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D37

- From the soil perspective, the anhydrous tank and the pickup truck are very similar.
- Stress at all depths for both the truck and tank are below threshold.
- Be cautious of pickup trucks in wet soil when loaded with significant weight in the truck bed.


Harvex Agromart
JANSEN84


CAUTION
AMMONIA
Harvex Agromart
psi
15.0
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
TIME
29 Thu Aug 2019

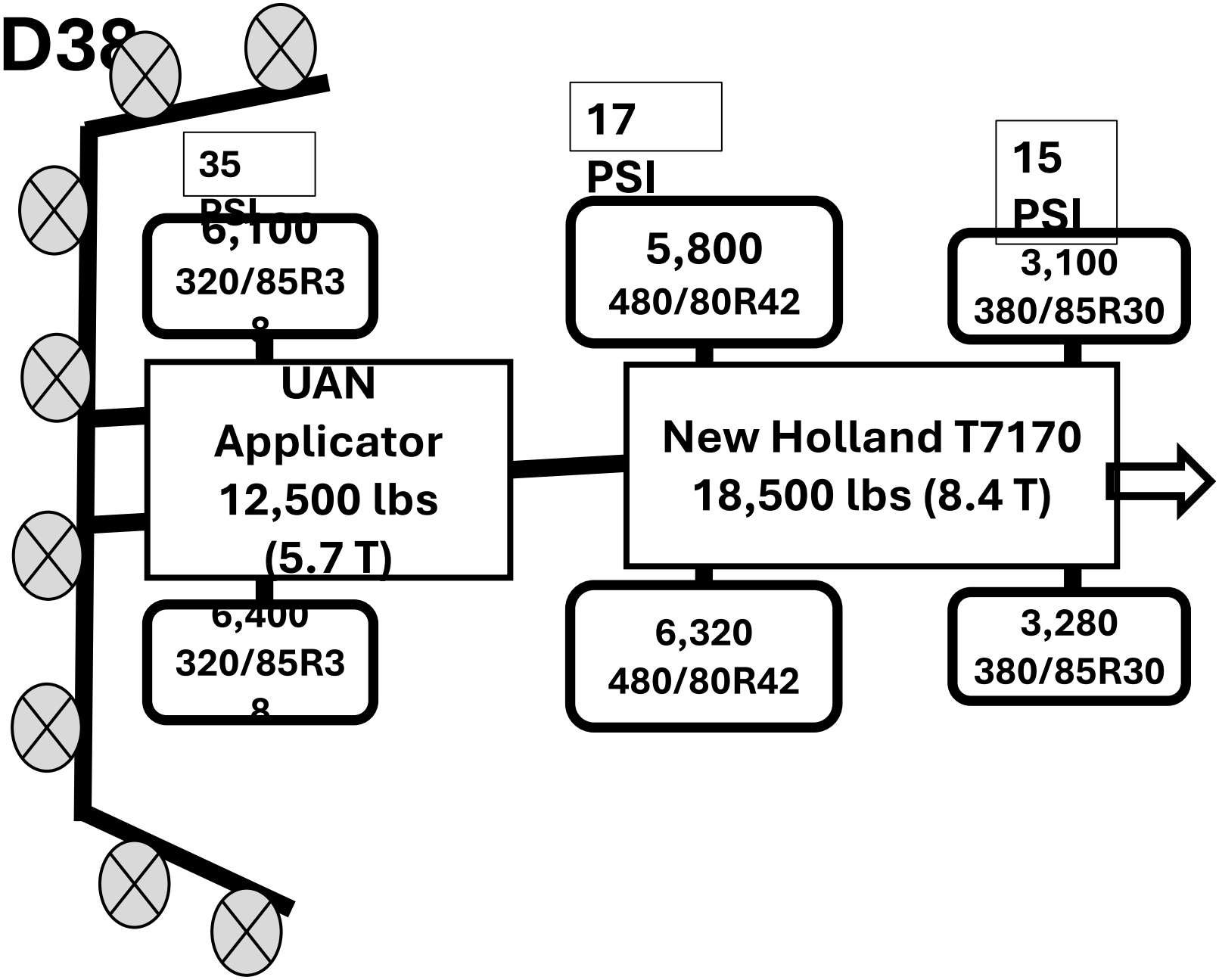
2019 Dundas Soil and Crop Compaction Event

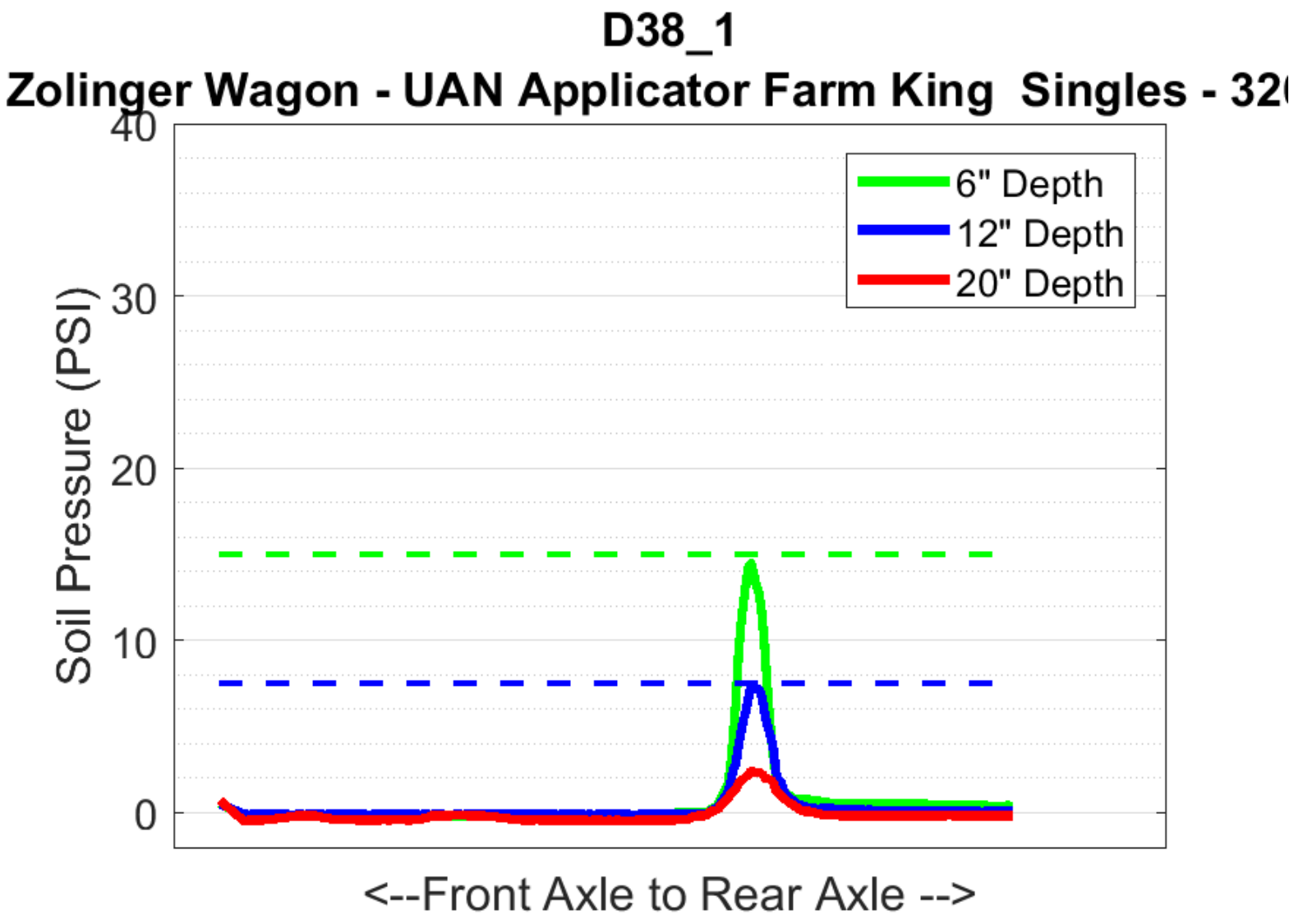
Exhibit: D38

Farmking UAN Applicator w 320s + New Holland T7.170 Row Crop Tractor w 480s


ZOLLINGERFARMS.
38
NEW HOLLAND

Exh: D38


35 PSI
6,100
320/85R38
17 PSI
5,800
480/80R42
15 PSI
3,100
380/85R30
UAN Applicator
12,500 lbs
(5.7 T)
New Holland T7170
18,500 lbs (8.4 T)
6,400
320/85R38
6,320
480/80R42
3,280
380/85R30


D38_1
Zolinger Wagon - UAN Applicator Farm King Singles - 32(
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D38

- Moderate axle weight and high tire pressure with narrow tires are to be avoided if trying to reduce the load on the soil.
- Given the soil conditions at the time, this configuration was not as problematic as we might have anticipated although look at the blue line at 12” touching the theoretical threshold line.


38
NEW HOLLAND


Farm

2019 Dundas Soil and Crop Compaction Event

Exhibit: D39
New Holland 330 Lrg Sq Baler w 620s + New Holland T7.270 Row Crop Tractor w Dual 520s


39
NEW HOLLAND
T7.270

Exh: D39

4,420
620/50R22.
5

4,280
620/50R22.
5

NH 330 Lrg Sq Baler
17,470 lbs (8 T)

29 PSI Baler Tires

4,350
620/50R22.
5

4,420
620/50R22.
5

4,400
520/85R4
2

4,120
520/85R4
2

15
PSI

4,140
420/85R30

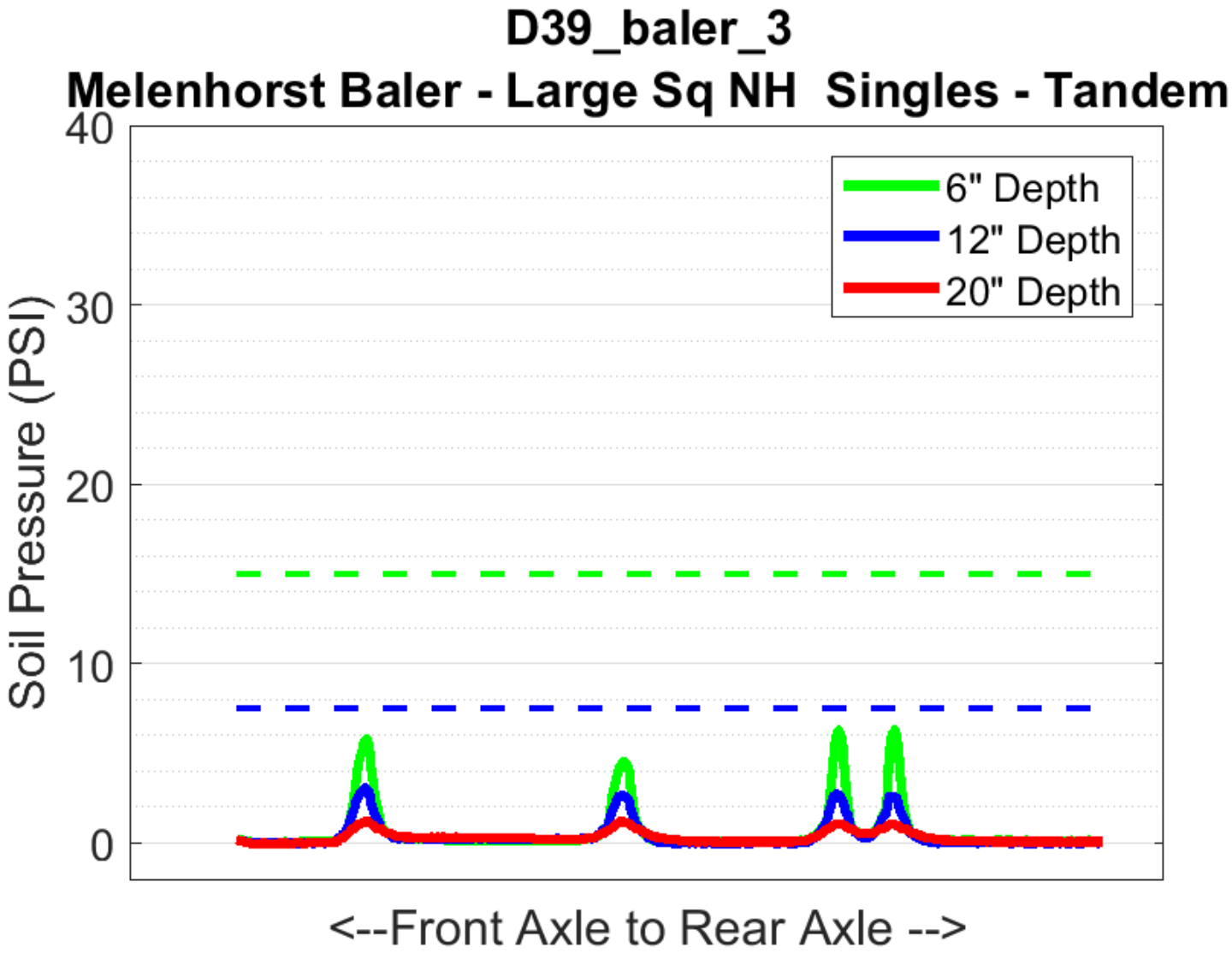
New Holland
T7.270
25,330 lbs (11.5 T)

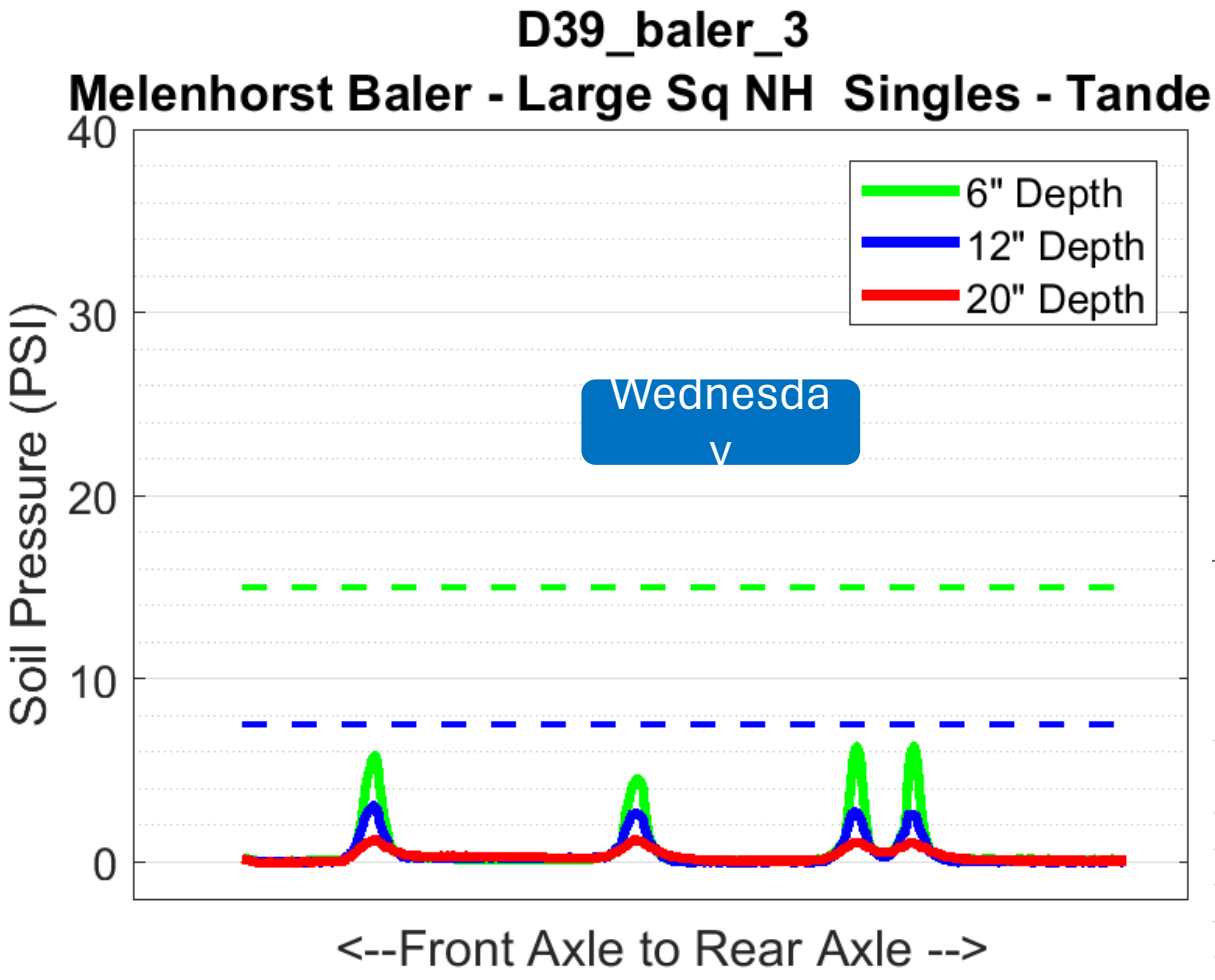
4,470
520/85R4
2

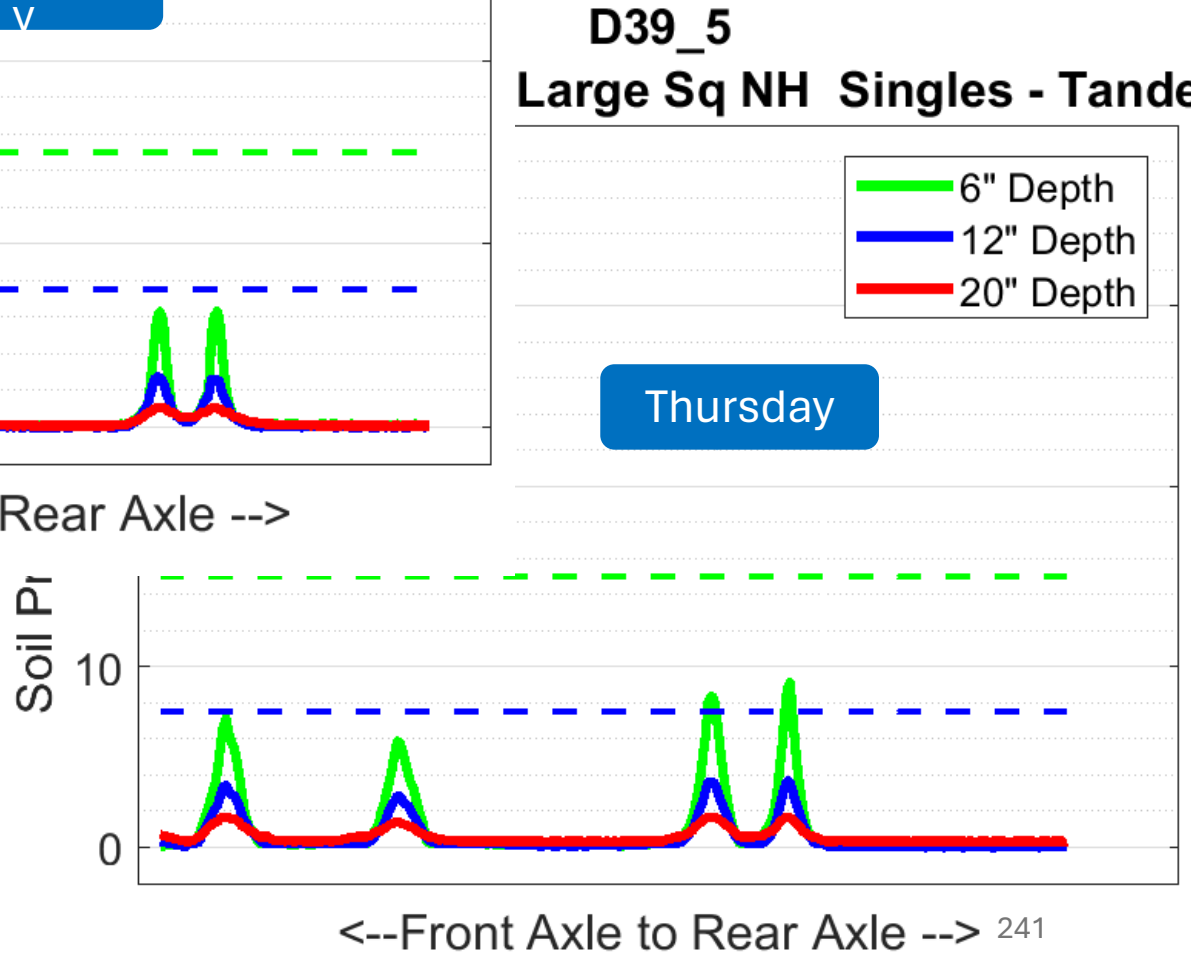
4,120
420/85R30

4,080
520/85R4
2

12 PSI


D39_baler_3
Melenhorst Baler - Large Sq NH Singles - Tandem
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D39_baler_3
Melenhorst Baler - Large Sq NH Singles - Tande
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
Wednesda
y
<--Front Axle to Rear Axle -->


D39_5
Large Sq NH Singles - Tande
6" Depth
12" Depth
20" Depth
Thursday
Soil Pr
10
0
<--Front Axle to Rear Axle -->

Plot Comments –D39

- This is a good example of the baler being a lighter machine than the tractor, but having a higher stress in the topsoil due to the tire configuration.
- This shows the impact of tire pressure when you look at the tire size relative to the psi for the baler vs tractor tires.
- Although its still a satisfactory configuration, caution in putting a baler like this in the hay field shortly after a significant rain could be problematic.

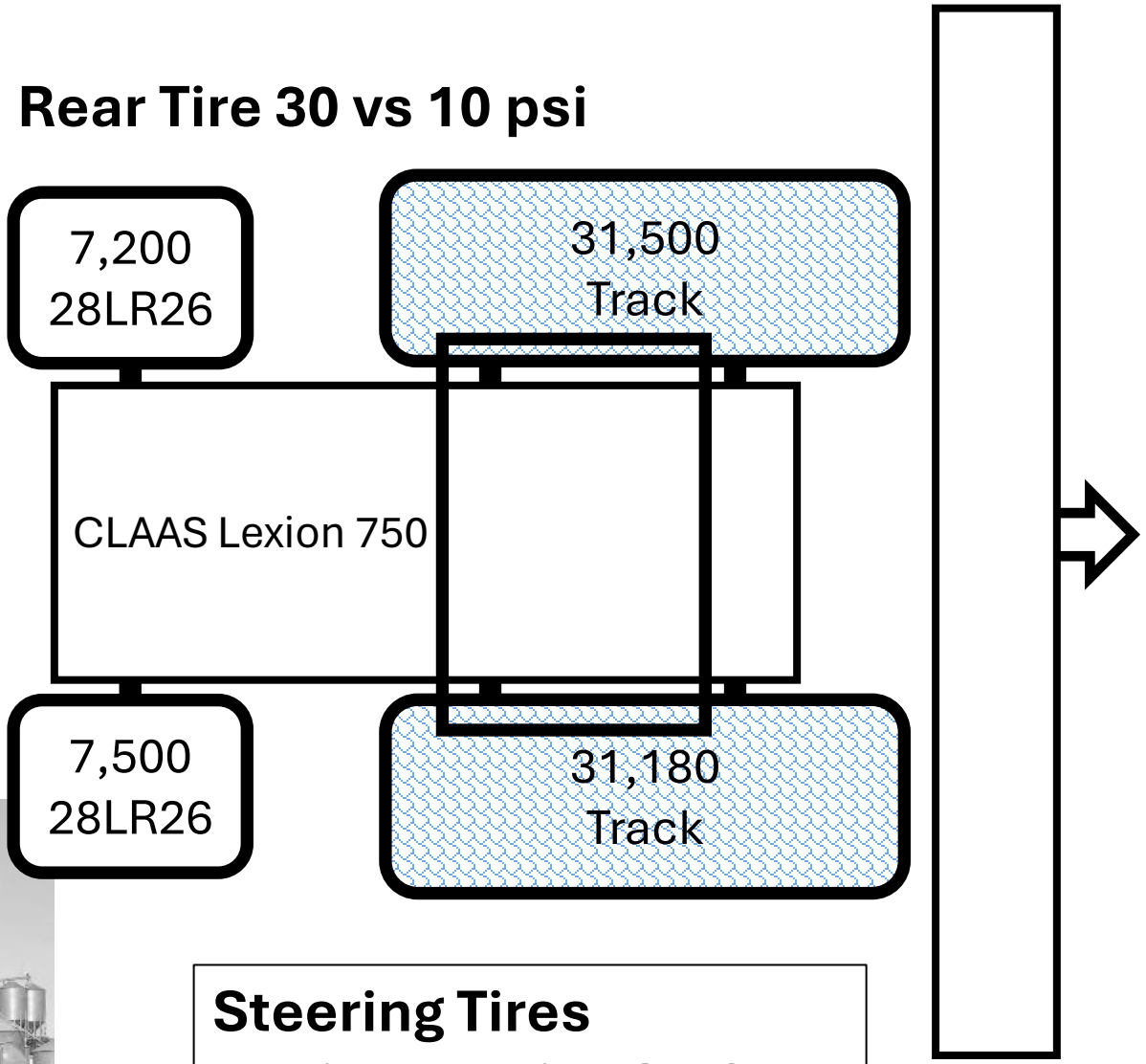

NELNA HOLSTEINS LTD.
NEW HOLLAND

2019 Dundas Soil and Crop Compaction Event

Exhibit: D40
Class 750T Tracked Combine with CTIS on Rear 28LR26 Tires


LEXION
40
A+B

Exh: D40

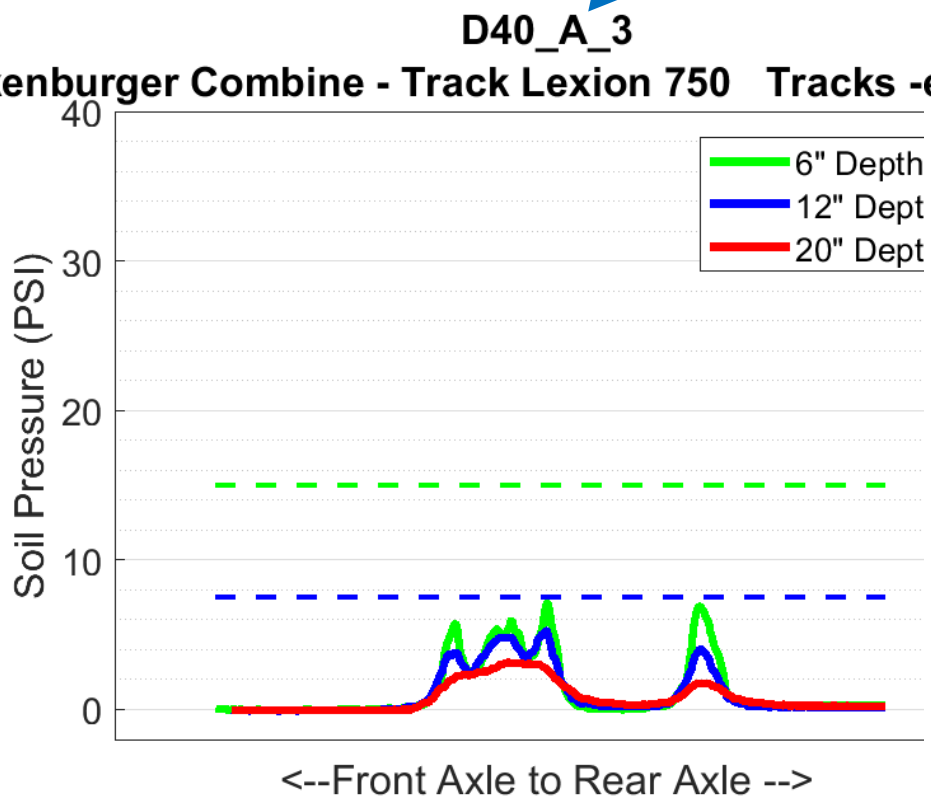


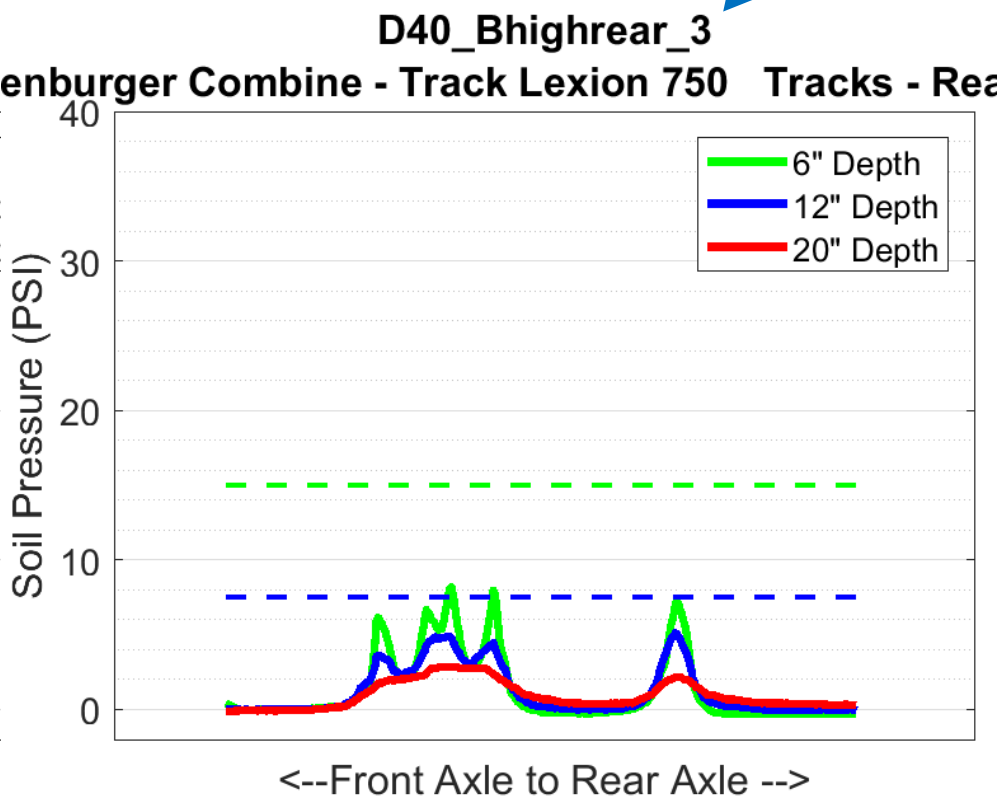
Steering Tires Equipped with CTIS to manage PSI

Wednesday

10 psi

30 psi





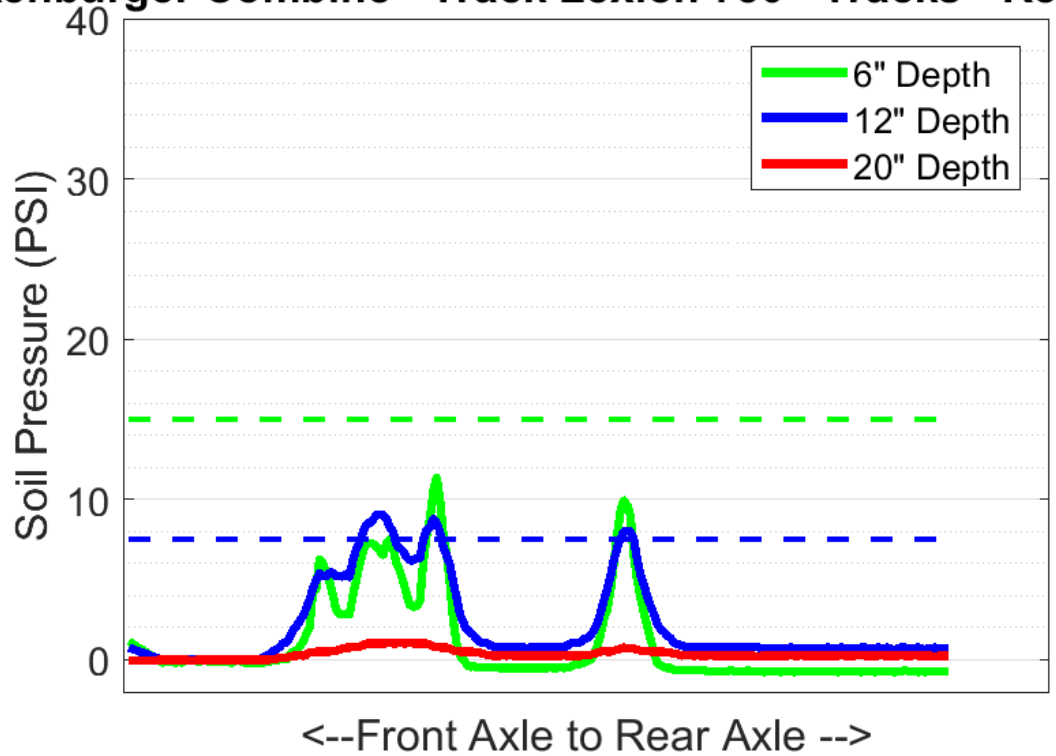
Thursday, morning vs afternoon

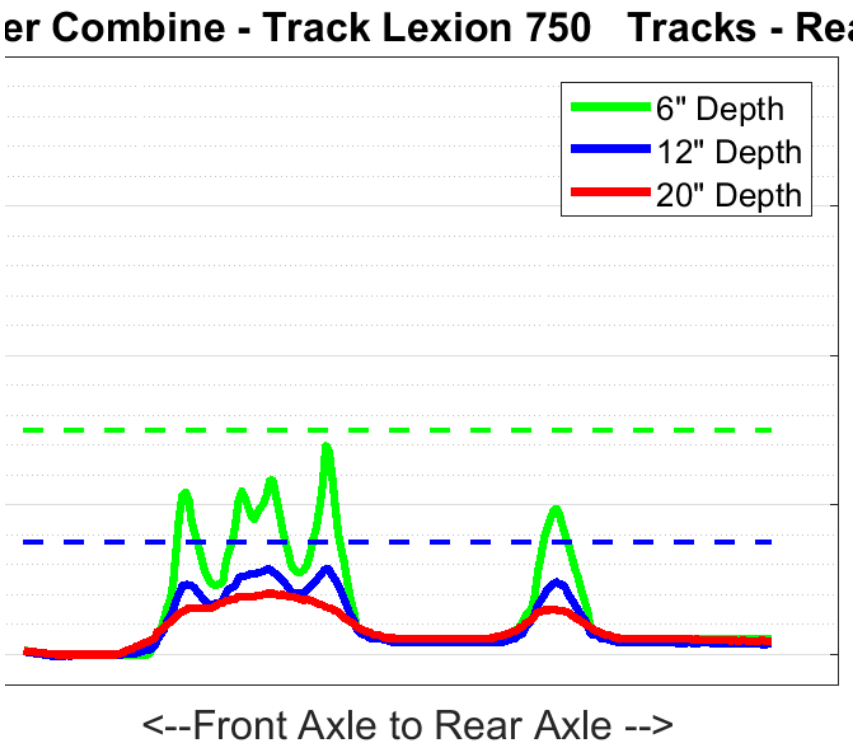
10 psi

D40_4

10 psi

D40_5





Plot Comments – D40

- This is a good configuration, comparable to dual and large signals.
- This is a very heavy corn head and when using other lighter heads, more weight may be put on the steering tires, which in previous events have shown to be more of a problem than the front wheels or tracks.
- Note that every track boggy wheel shows in the sensors.
- Even with a good configuration, the overall weight of a full combine is putting lots of weight down deep in the soil compared to other configurations tested, ie see the red (lower) line movement compared to many others where we don’t see that line move much.


CLAAS
Cedar Lodge Farms
MORRISBURG ON
750
LEXION

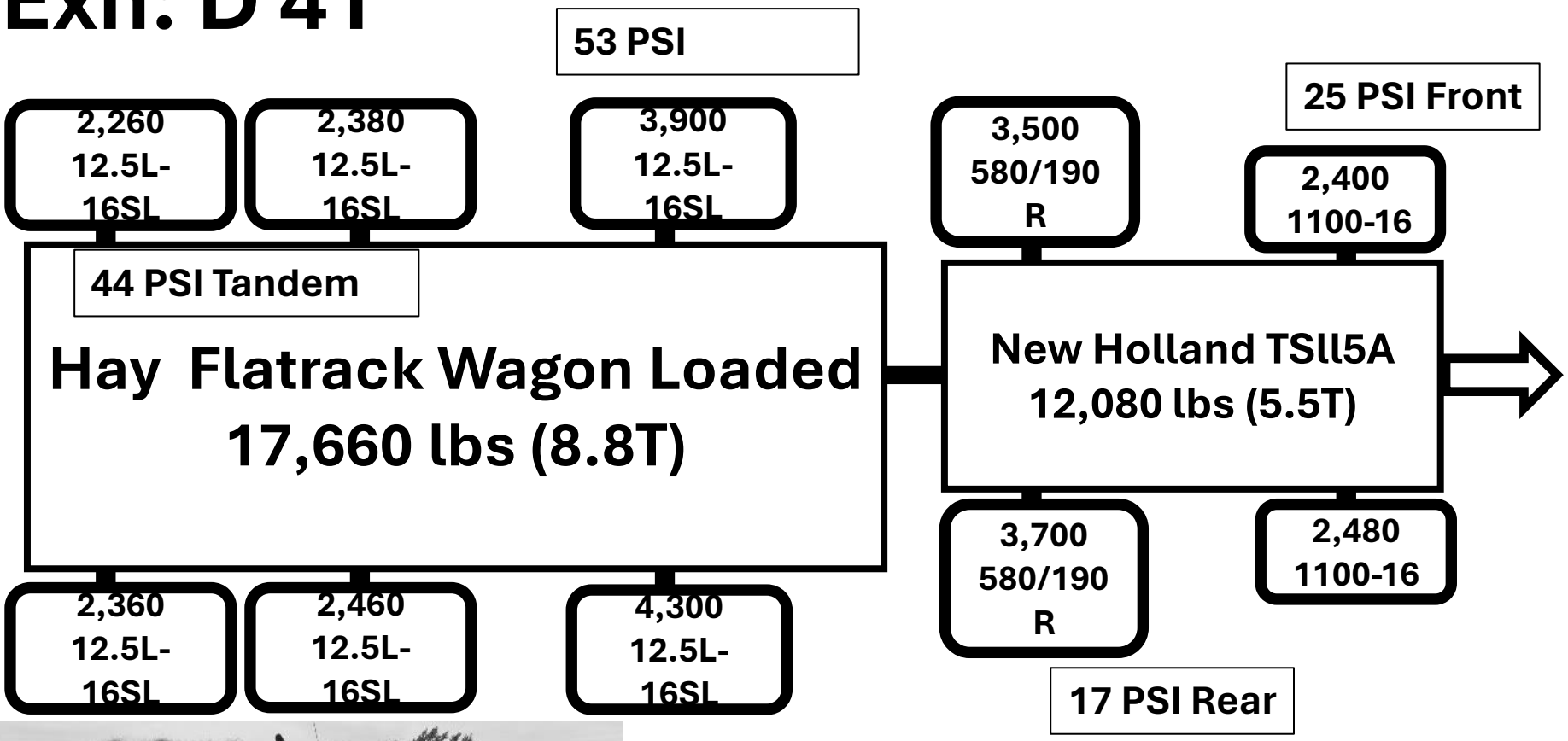

CLAAS
LEXION

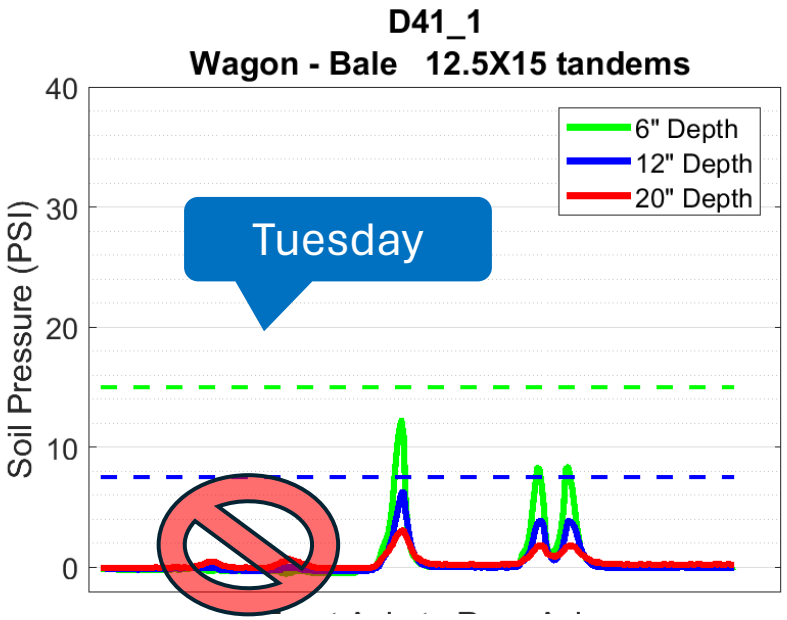
2019 Dundas Soil and Crop Compaction Event

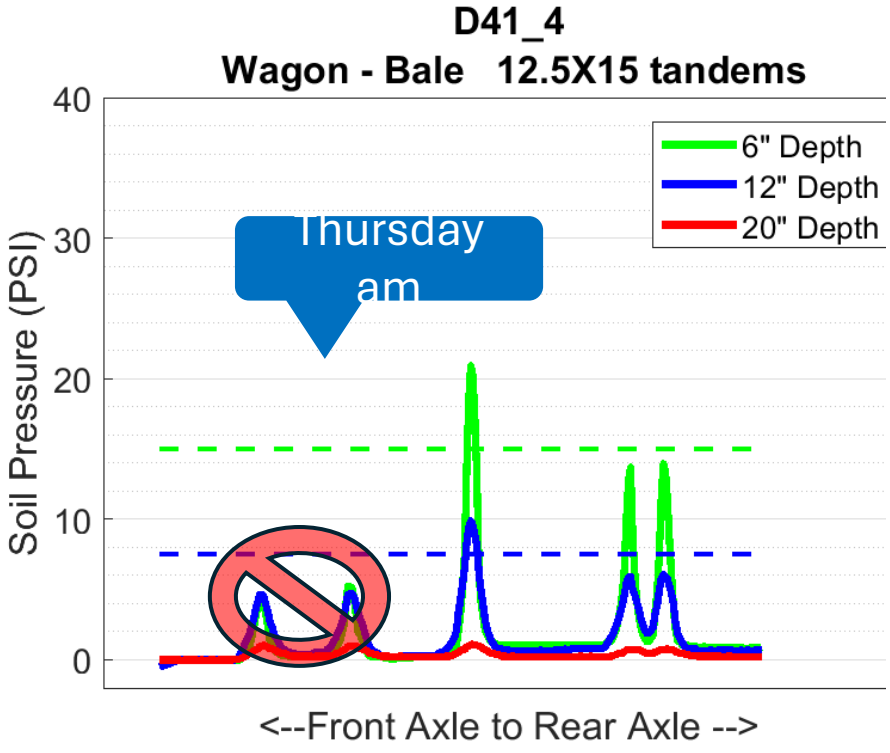
Exhibit: D41+D8
Hay Wagon Tandem Rear w 12.5Ls + NH TS115A Singled Row Crop Tractor

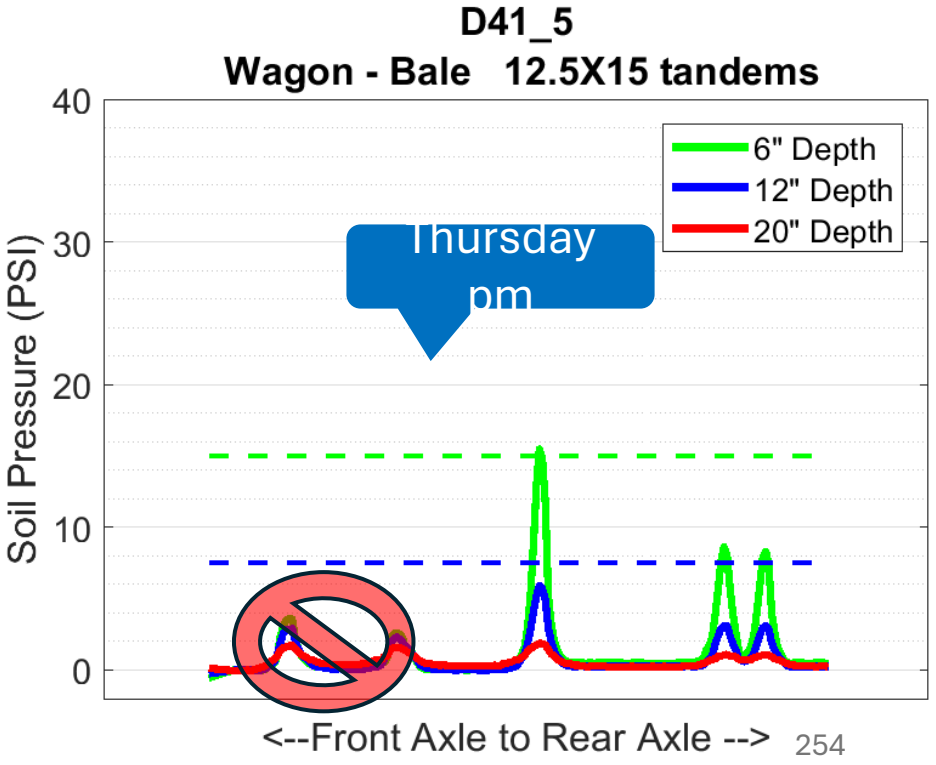

8
44
42
New Holland
TS115

Exh: D 41


53 PSI
2,260
12.5L-16SL
2,380
12.5L-16SL
3,900
12.5L-16SL
44 PSI Tandem
Hay Flatrack Wagon Loaded
17,660 lbs (8.8T)
2,360
12.5L-16SL
2,460
12.5L-16SL
4,300
12.5L-16SL
25 PSI Front
3,500
580/190 R
2,400
1100-16
New Holland TSll5A
12,080 lbs (5.5T)
3,700
580/190 R
2,480
1100-16
17 PSI Rear


D41_1
Wagon - Bale 12.5X15 tandems
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
Tuesday


D41_4
Wagon - Bale 12.5X15 tandems
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
Thursday am
<--Front Axle to Rear Axle -->


D41_5
Wagon - Bale 12.5X15 tandems
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
Thursday pm
<--Front Axle to Rear Axle -->

Plot Comments – D41

- Hay wagons, similar to the gravity wagons. High pressure bias ply tires creating high soil stress.
- Note the difference in the front vs back of the wagon between single vs tandem setup, tandems reduce the load on the soil.
- These tires as bias are quite round making it harder to centre the weigh on the sensor, we might have expected more load response here and rounded tires put more pressure into the soil as the contact area is reduced.
- Compared to D42 with larger radial tires, but single front and rear axles we would have expected high load at the sensors.
- The tractor in this instance was not measured based on tire position relative to the target wagon tires.


8
44
42


8
44
42

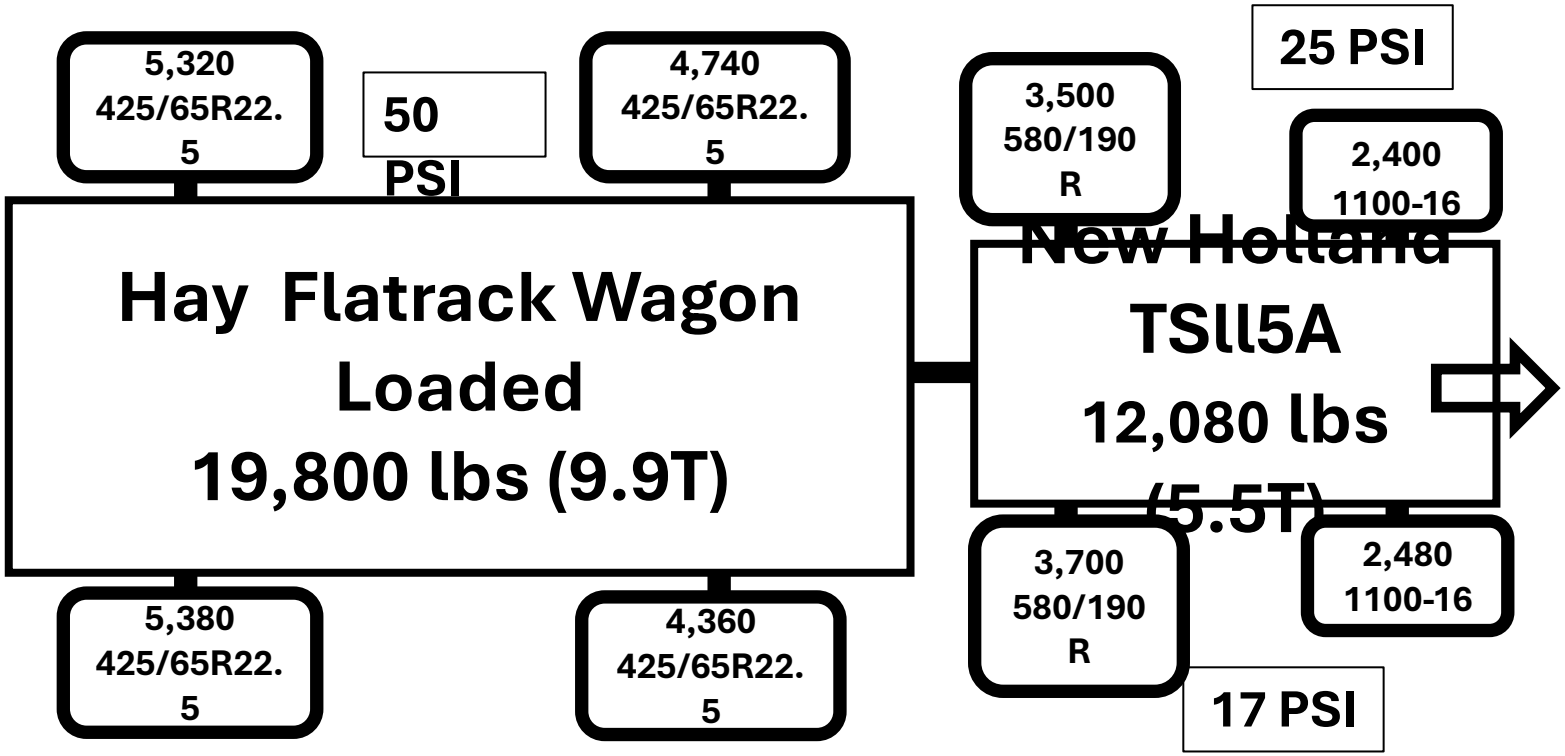

NewHolla
Plus

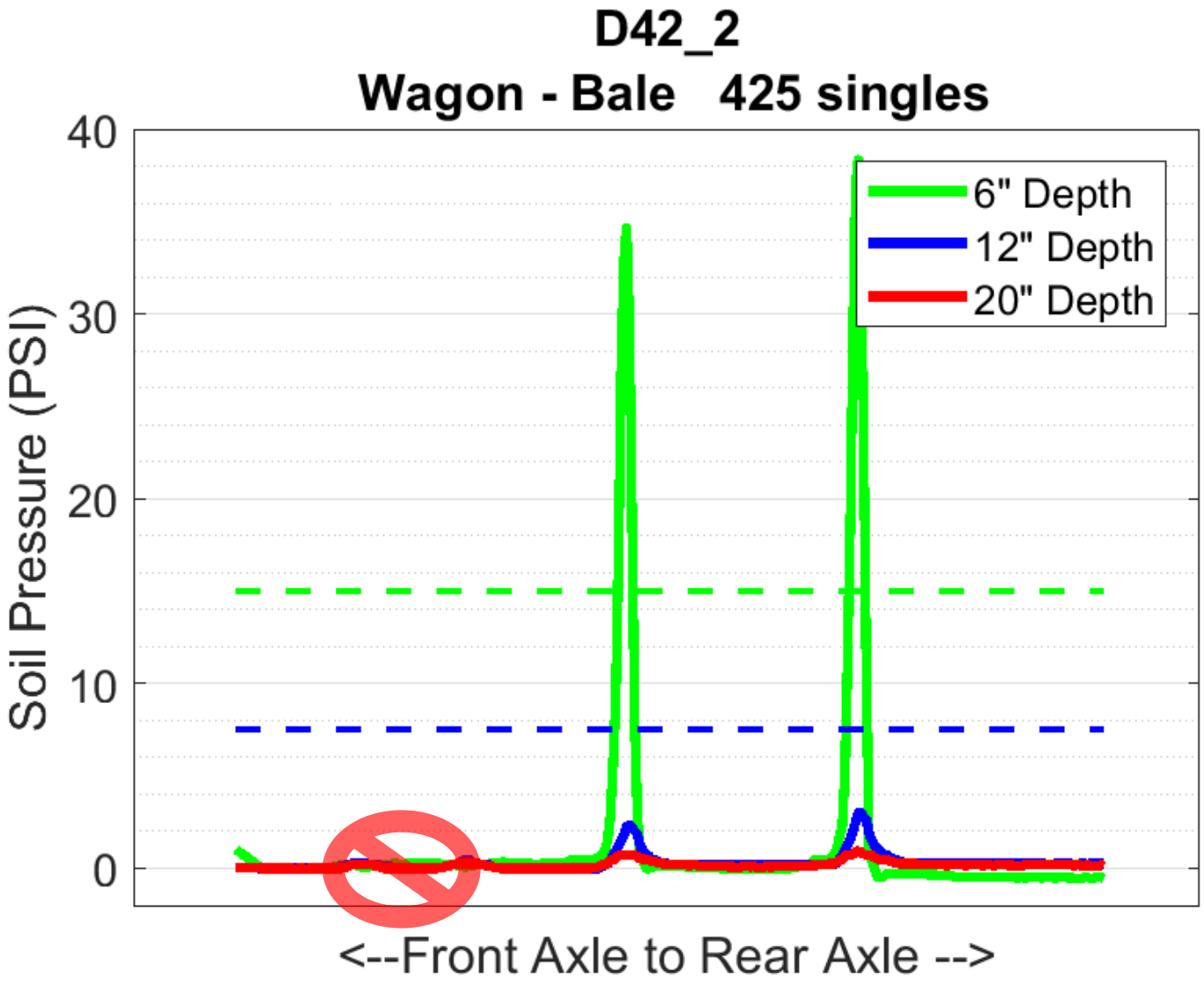
2019 Dundas Soil and Crop Compaction Event

Exhibit: D42+D8
Flat Rack Hay Wagon w 425s Singles


8
41
42
New Holland
TS115

Exh: D42


5,320
425/65R22.5
50 PSI
4,740
425/65R22.5
Hay Flatrack Wagon
Loaded
19,800 lbs (9.9T)
5,380
425/65R22.5
4,360
425/65R22.5
25 PSI
3,500
580/190R
2,400
1100-16
New Holland
TSll5A
12,080 lbs
(5.5T)
3,700
580/190R
2,480
1100-16
17 PSI


D42_2
Wagon - Bale 425 singles
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D42

- A large and radial tire compared to D41. High tire pressure causing high top soil stress but low load in the subsoil.
- Although good to keep deeper soil with less stress, the stress at the 6” depth might cause severe enough rutting to force removal of the forage stand early which can be costly.


8
41
42


8
41
42


NewHolland
TS115
Plus

2019 Dundas Soil and Crop Compaction Event

Exhibit: D43
Kubota RTV 900XT Side by Side


W1+2 43
RTV
26
2584

Exh: D43

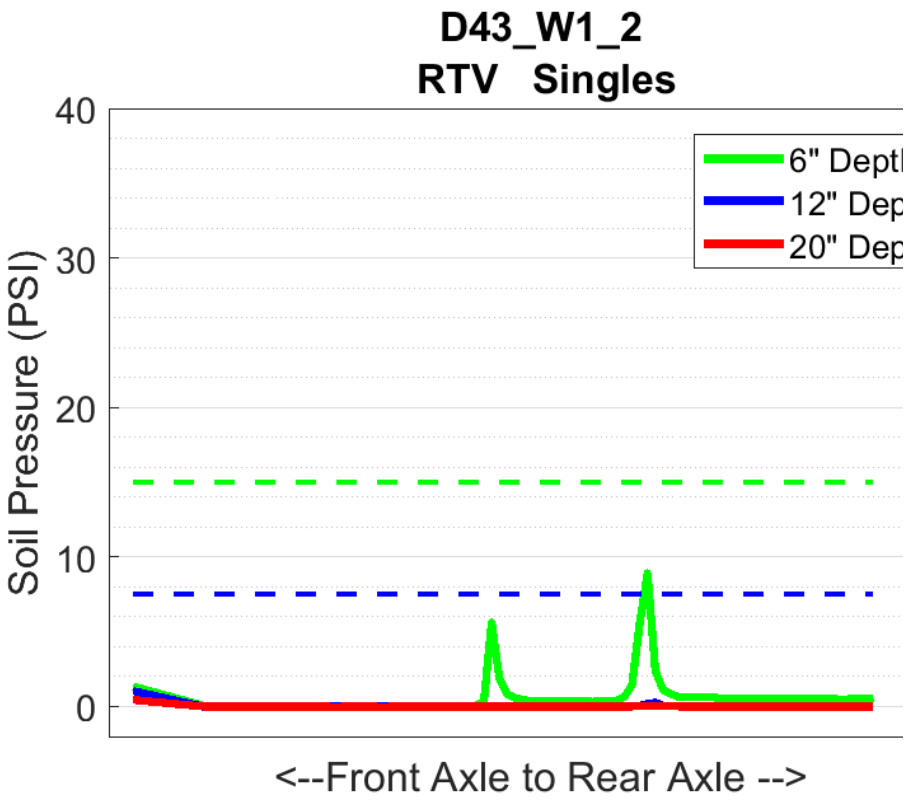
Weights: Loaded /Empty

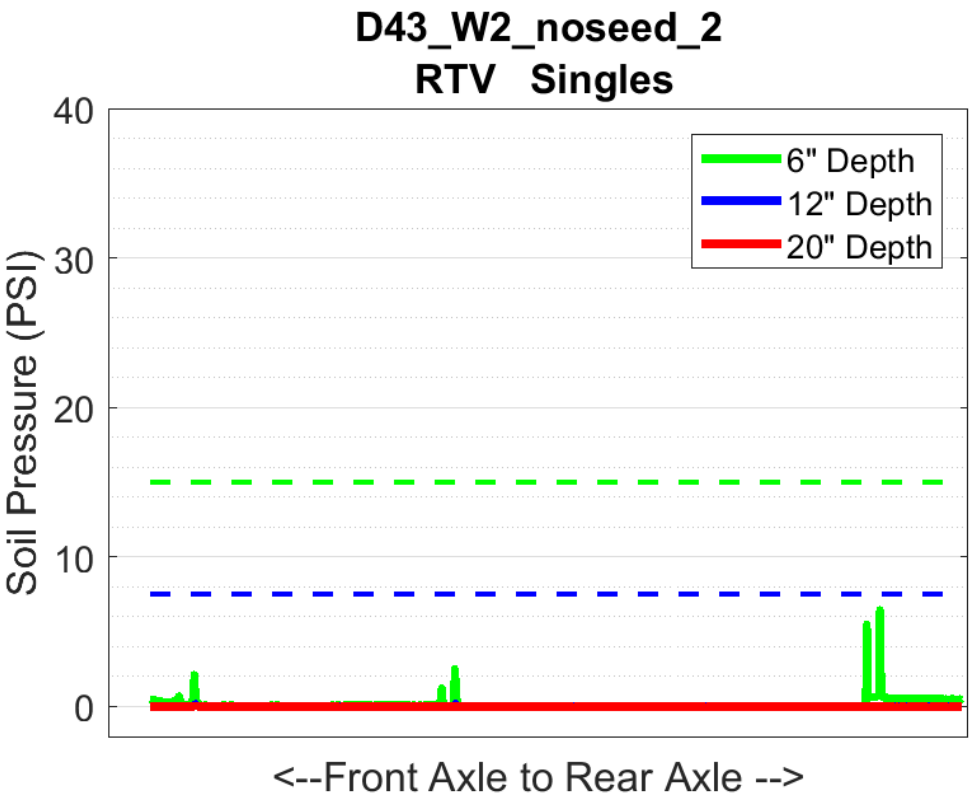
1000/680 25X10X1 2NHS	420/420 25X10X12 NHS

Kubota RTV 900 XT

400/300 25X10X1 2NHS	420/420 25X10X12 NHS

8 PSI all Tires


D43_W1_2
RTV Singles
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->


D43_W2_noseed_2
RTV Singles
40
30
20
10
0
Soil Pressure (PSI)
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D43

- This is a good example of a light vehicle only causing stress in the topsoil, however due to the weight and small tire size it is almost comparable to a pickup truck.
- Note no response deeper down in the soil.
- It does speak to the aspect of low weight equals little threat even when soil conditions are poor.


W1+2 43
KUBOTA
DIESEL 4x4
RTV


W1+2 43
RTV


W1+2 43
RTV

2019 Dundas Soil and Crop Compaction Event

Exhibit: D44

New Holland Backhoe LB75.B w 19.5R and 12.0F Bias Tires


44

Exh: D44

5,920
19.5L/24

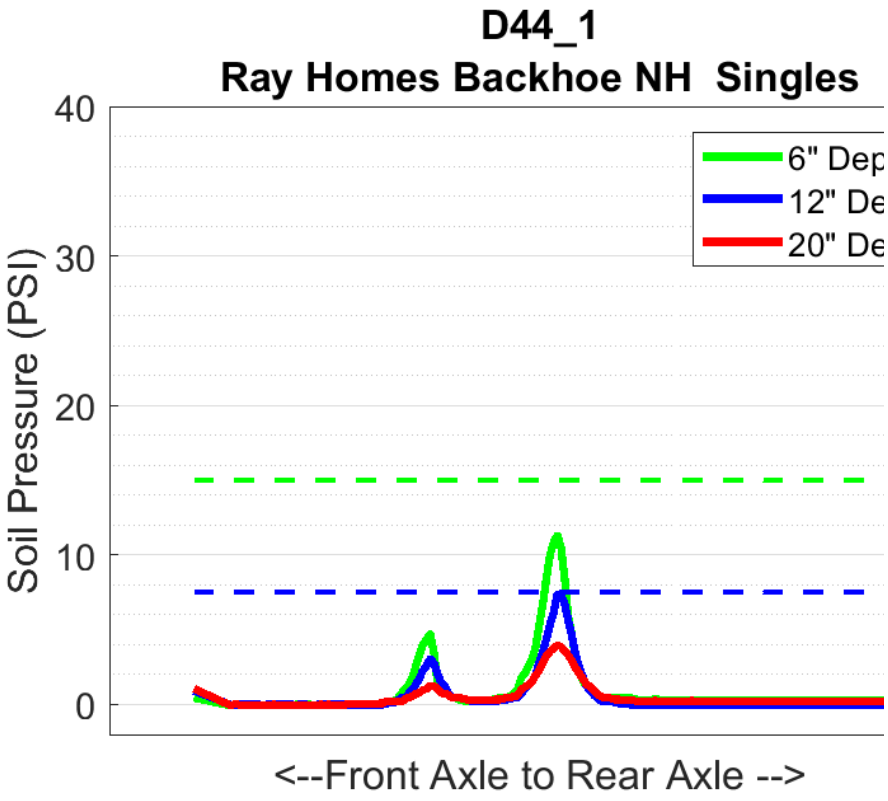
2,080
12-16.5

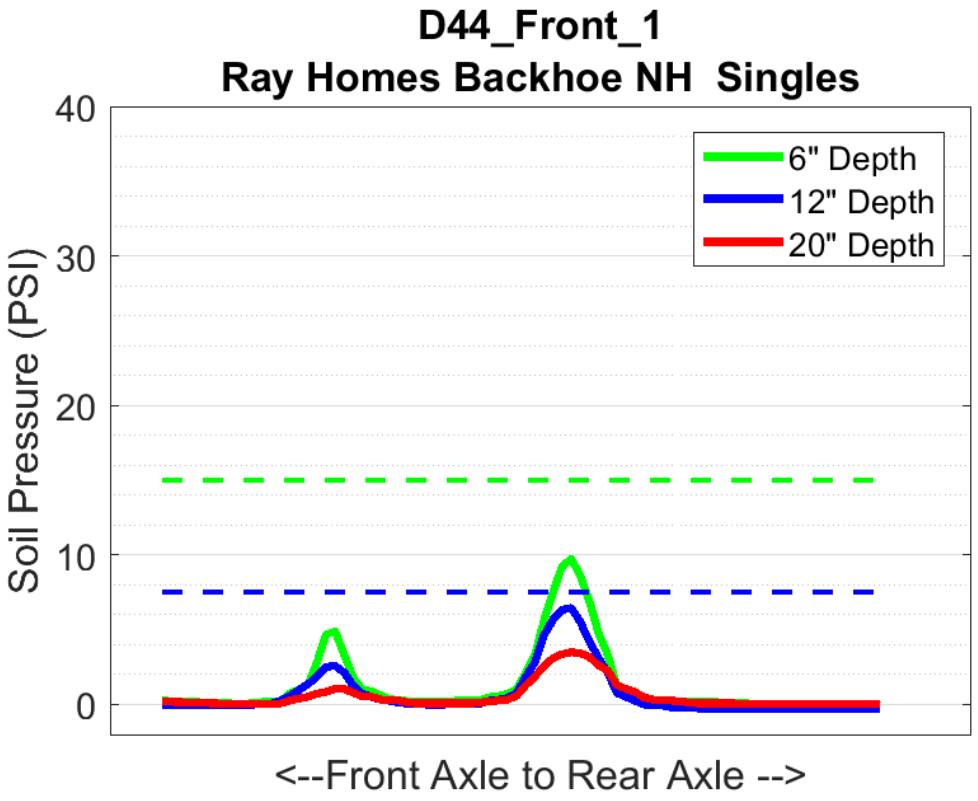
New Holland Backhoe
LB75.B
16,460 lbs (8.2 T)

6,320
19.5L/24

2,140
12-16.5

29 PSI all Tires


D44_1
Ray Homes Backhoe NH Singles
Soil Pressure (PSI)
40
30
20
10
0
6" Dep
12" De
20" De
<--Front Axle to Rear Axle -->


D44_Front_1
Ray Homes Backhoe NH Singles
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D44

- The front and rear tires were somewhat misaligned. So each plot shows the peak of the tires individually.
- Construction equipment often has bias tires and this shows here where the shallow load is detected but the overall weight is low relative to seeing load detected at depth.


NEW HOLLAND
B 75B
44


NEW HOLLAND
B 75B
44


NEW HOLLAND

2019 Dundas Soil and Crop Compaction Event

Exhibit: D45+D7

Demco 750 Dualled Grain Cart w 650s + NH T7.260 Dualled Rear Row Crop Tractor w 480s


750
7
45

Exh: D45

10840
650/85R38

11860
650/85R38

Demco
Posi flow 750
Grain Cart
43,180 lbs
(19.6T)

10980
650/85R38

9500
650/85R38

15/20 PSI for
outer/inner

2,720
480/80R46

3,740
480/80R46

17 PSI Front

4,400
380/85R34

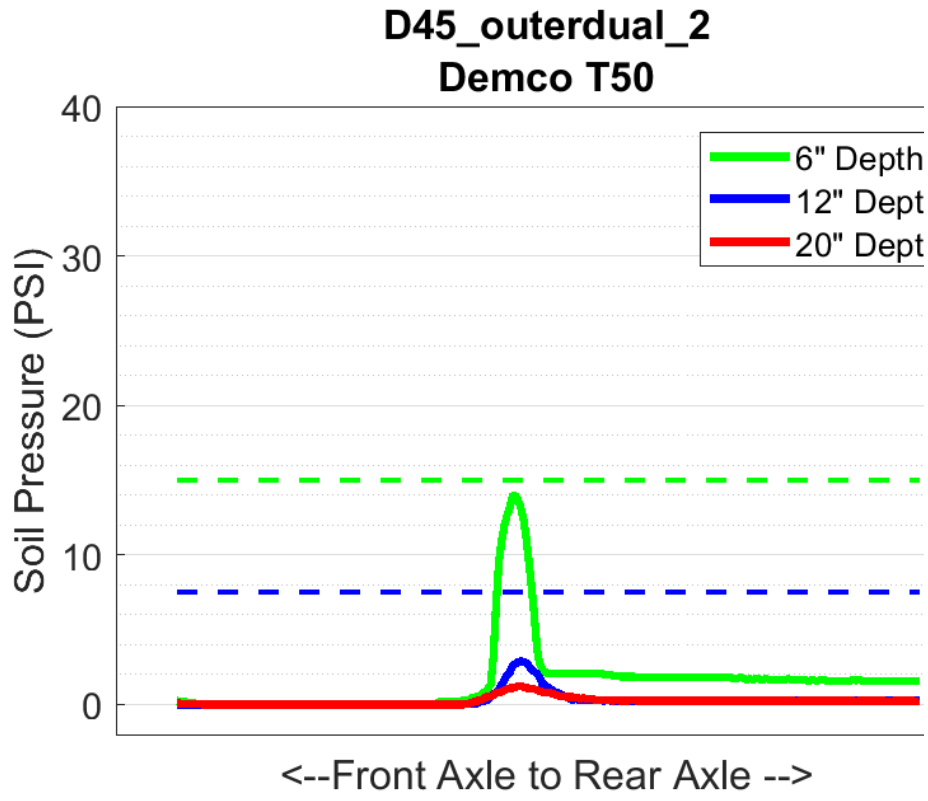
New Holand
T7.260
21,460 lbs (9.7T)

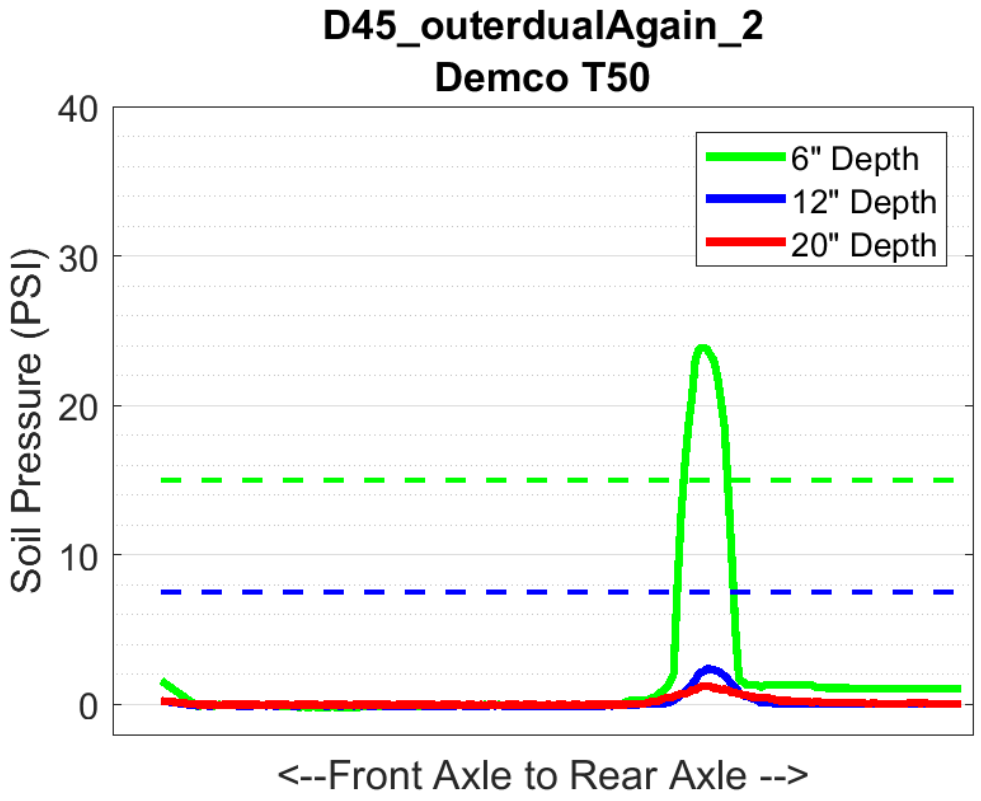
3,300
480/80R46

2,900
480/80R46

4,400
380/85R34

6/9 PSI for
outer/inner Rear


D45_outerdual_2
Demco T50
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Dept
20" Dept
<--Front Axle to Rear Axle -->


D45_outerdualAgain_2
Demco T50
Soil Pressure (PSI)
40
30
20
10
0
6" Depth
12" Depth
20" Depth
<--Front Axle to Rear Axle -->

Plot Comments – D45

- High axle weight even on a 20 psi tire causing high stress shallow but dual configuration and overall load protecting deep threat.
- Dual wheel configuration spreads the load and lowers the threat of heavy weight load being driven deeper.
- In this configuration most of the load is detected shallow and while it might impact the crop this year, the freeze/thaw and time will eliminate it easily relative to when the weight is driven deeper in many other grain buggy configurations.


NEW HOLLAND

2019 Dundas Soil and Crop Compaction Event

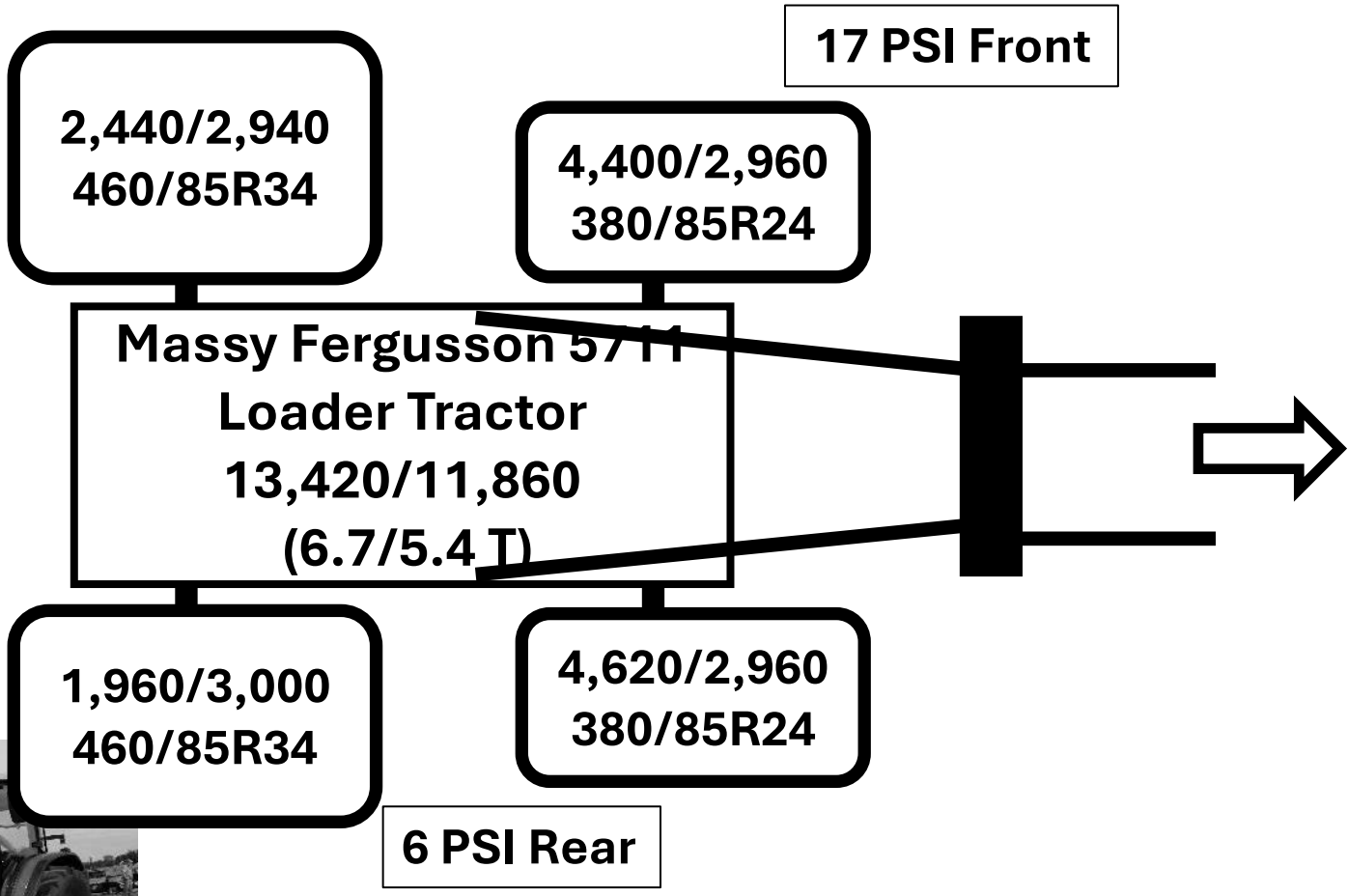
Exhibit: D46

Massy Ferguson 5711 Row Crop Loader Tractor w 380/460's w & wo Load

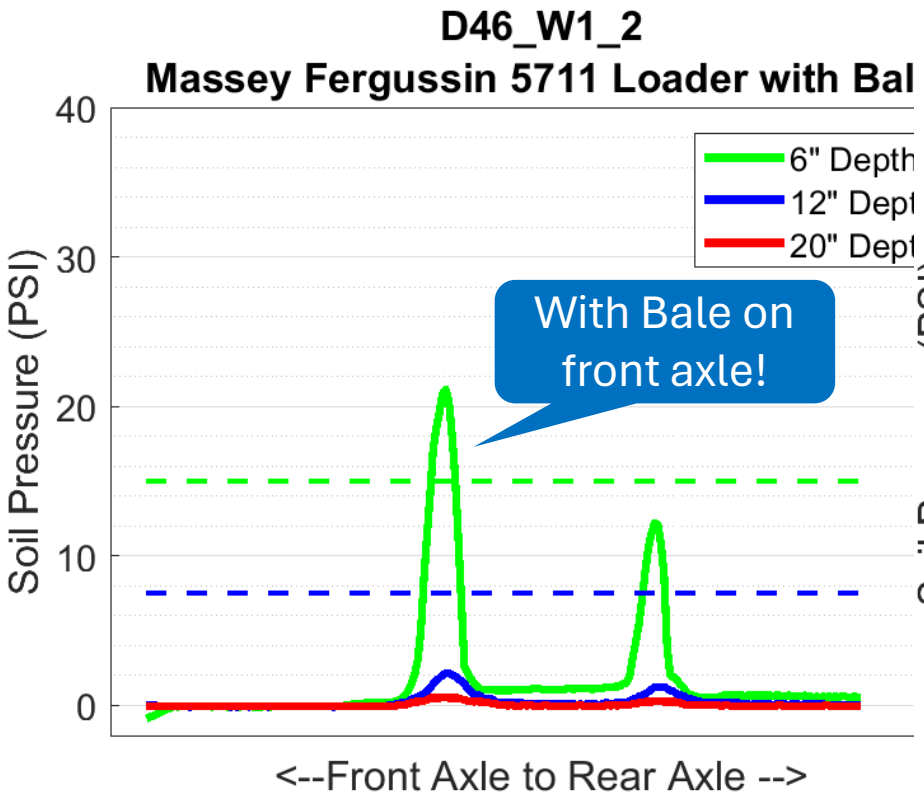

27

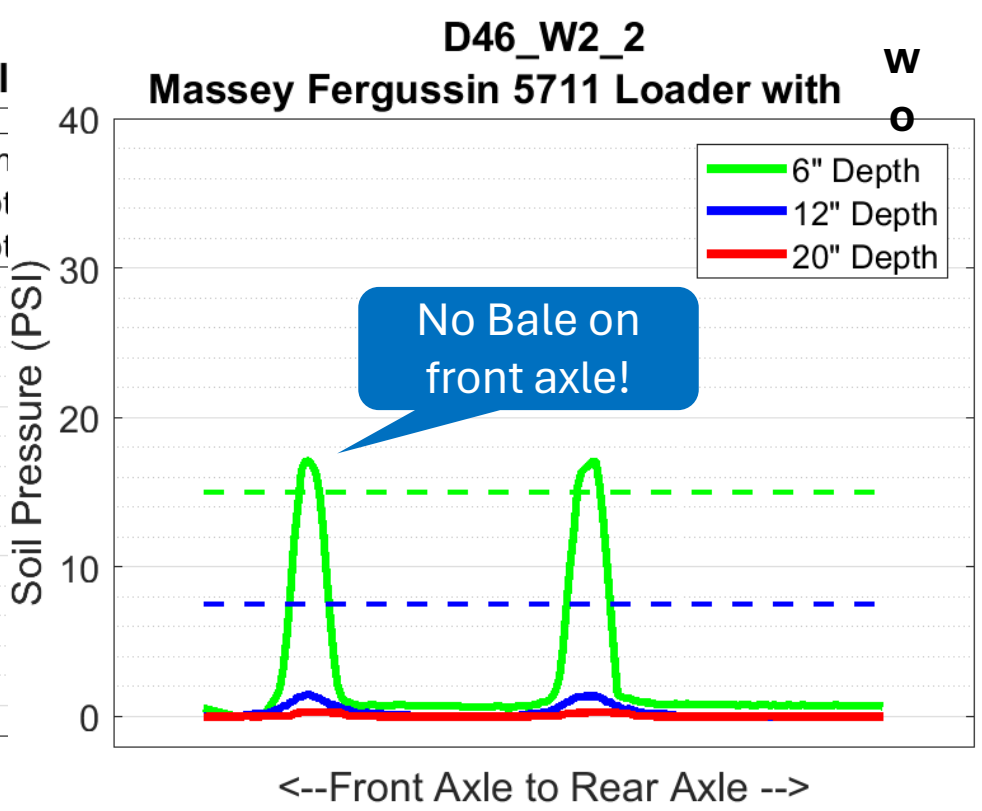
Exh: D46

Weight: Loaded W 2 bales/Unloaded



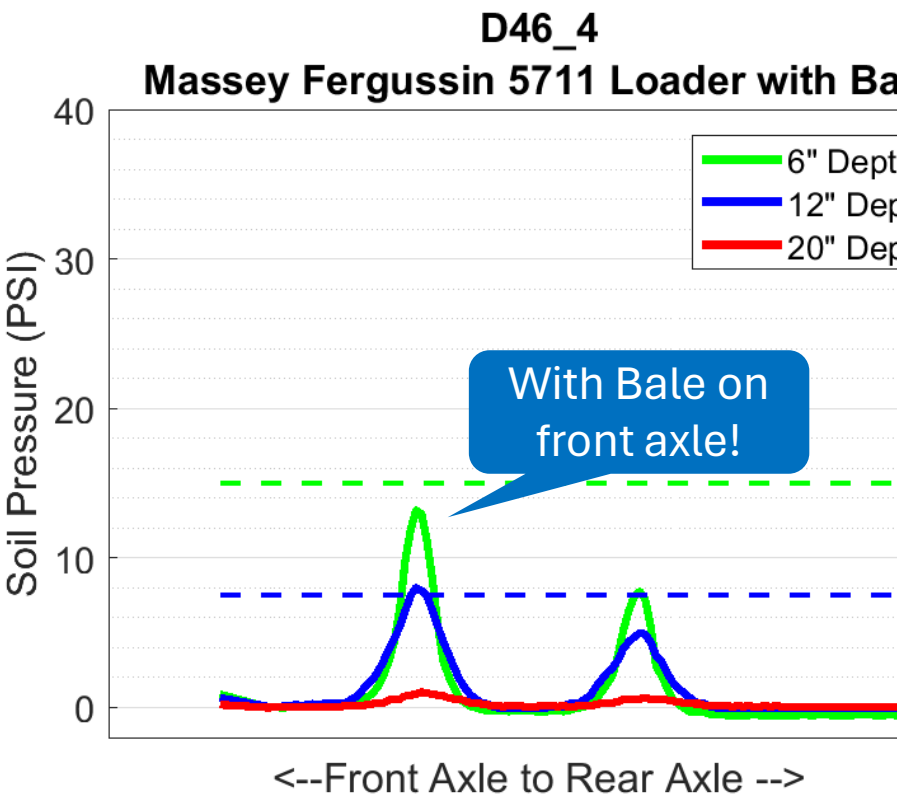
Wednesday am

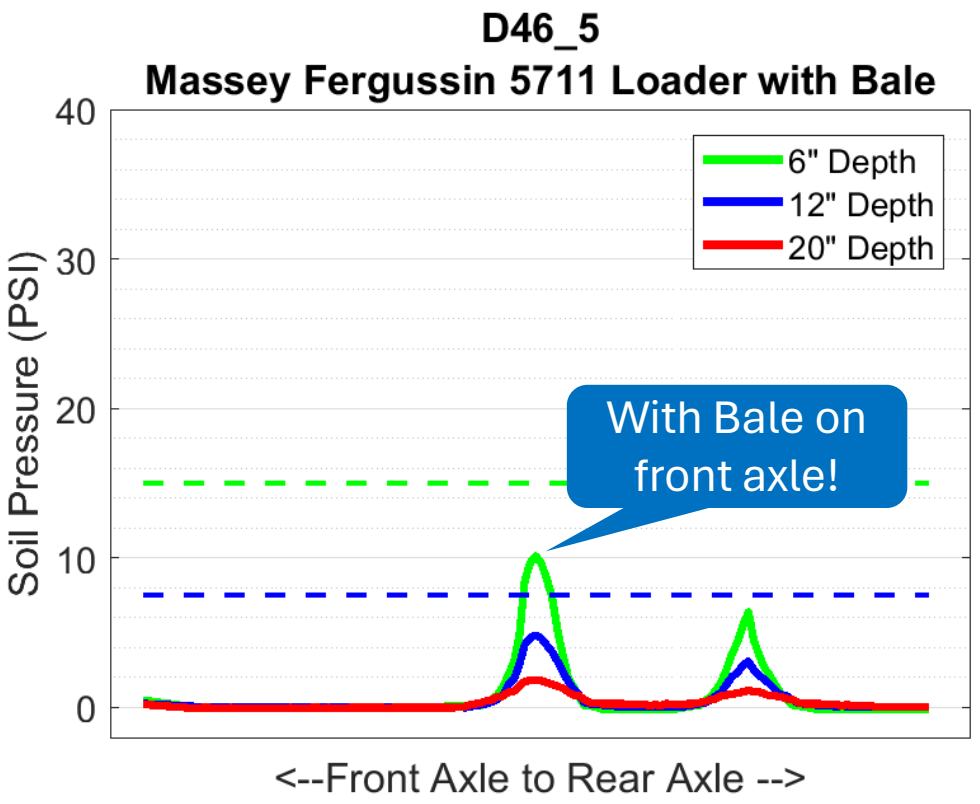




Thursday am

Thursday pm

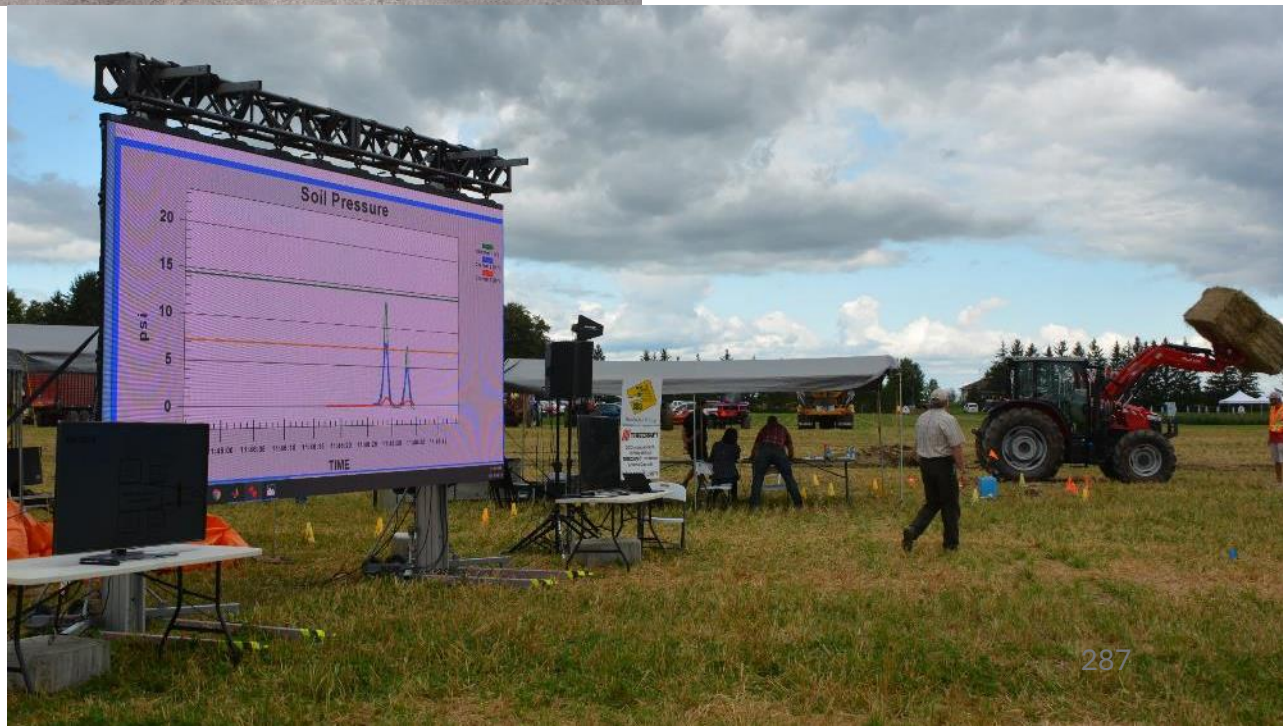




Plot Comments – D46

- Row crop loader tractors are often not configured to spread the load of on the front axle because of tire size leading to increased stress especially in the top soil area.
- The data in the two plots show how the same configuration can result in different responses due to changes in soil factors where the sensor pits are located, even when close to each other in what appears to be a uniform field. As well Wednesday rainfall could have dried more by Thursday pm vs am leading to different response levels.


W1+2
28
46


Soil Pressure
20
15
10
5
0
psi
TIME

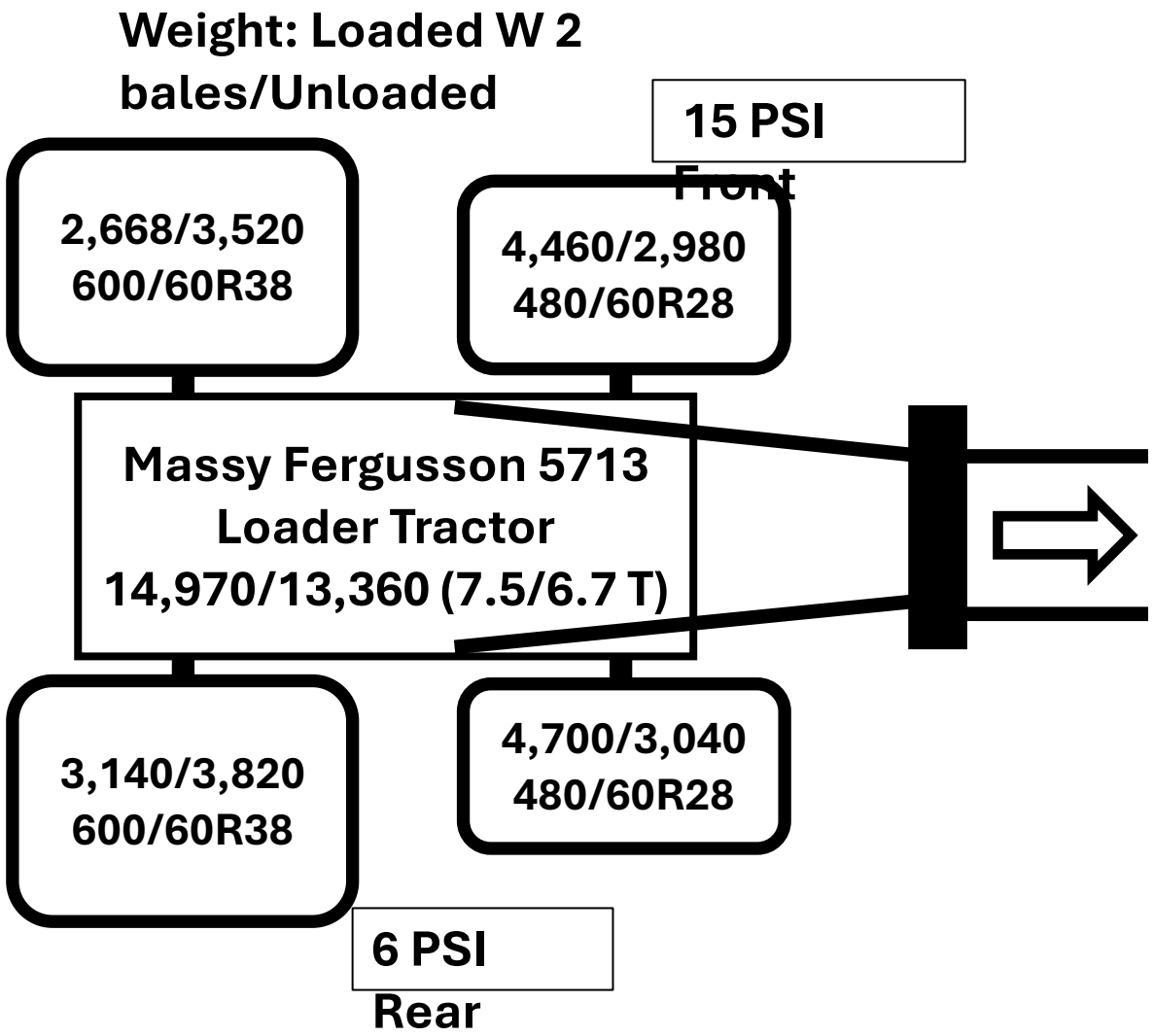
2019 Dundas Soil and Crop Compaction Event

Exhibit: D47

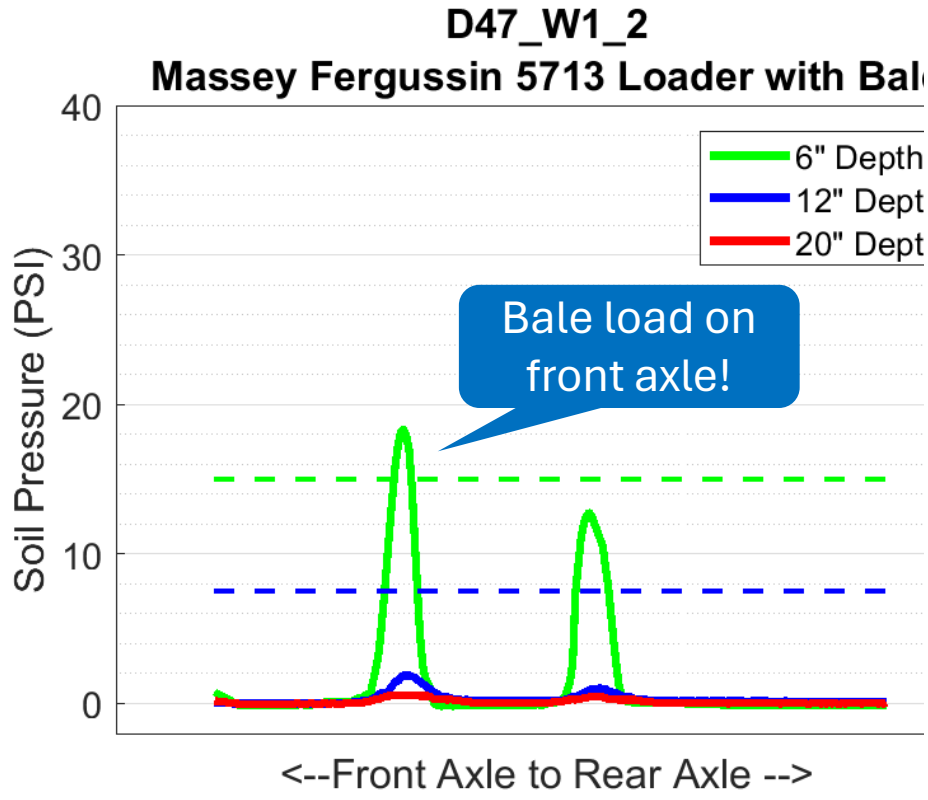
Massy Ferguson 5713S Row Crop Loader Tractor w 480/600s w & wo Load

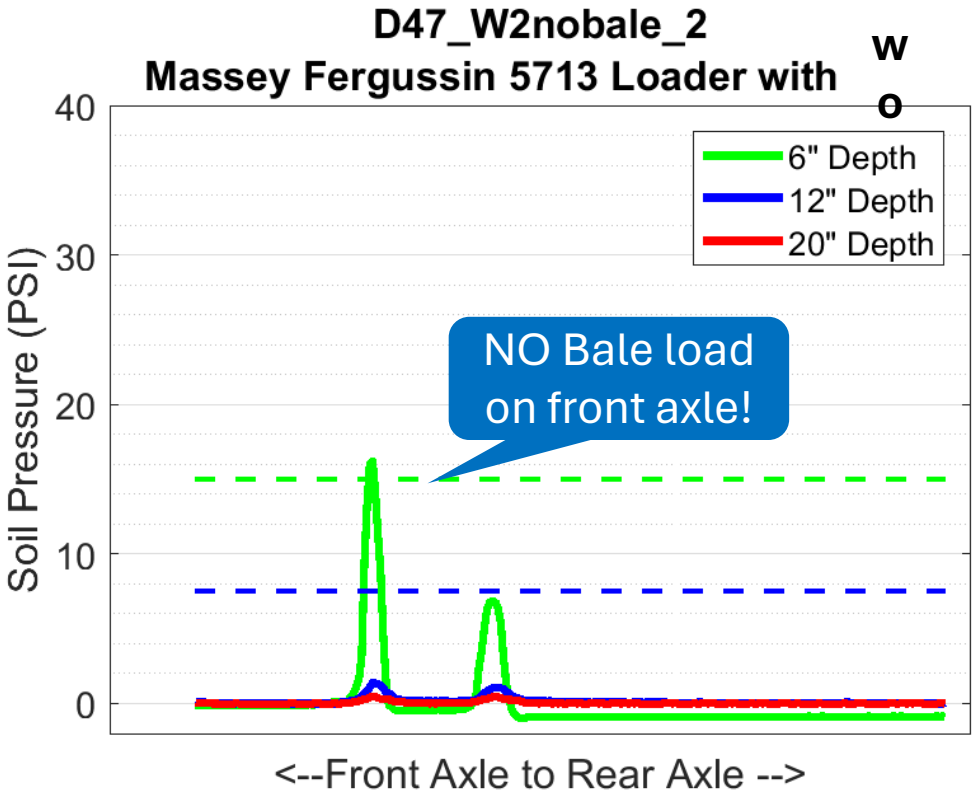

47
W1+2
27
MASSEY FERGUSON

Exh: D47


Weight: Loaded W 2 bales/Unloaded
15 PSI
Front
2,668/3,520
600/60R38
4,460/2,980
480/60R28
Massy Fergusson 5713
Loader Tractor
14,970/13,360 (7.5/6.7 T)
3,140/3,820
600/60R38
4,700/3,040
480/60R28
6 PSI
Rear

Wednesday am





Plot Comments – D47

- This tractor of similar size to D46 has 480/600s at 15/6psi respectively.
- The response observed was similar although we were surprised the load on the front axle without the bales was still higher than expected.
- A rear weight may be a good consideration when loading bales in the field with a row crop tractor loader to prevent all the weight being moved forward onto the smaller, higher psi tires.


47
MASSEY FERGUSON
S 5713


FL3810
6PSI


27


MASSEY FERGUSON
S 5713