Podium Premium Newsletter

March 2014

Welcome to the Podium *Premium* Club!
The technical information found at *www.antiquetractorpullguide.com* is like no other information out there. In depth explanation of the **how and why** of successful tractor pulling are designed to improve your performance at the next tractor pull, while having more fun at the same time.

Podium Spotlight – Bryan Haithcox

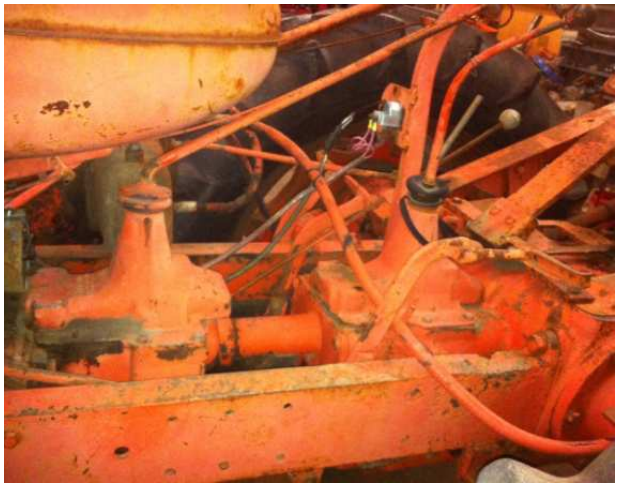
Bryan Haithcox from Puyallup, WA is a 26yr old who has recently caught the pulling bug. After refurbishing a John Deere 1520 utility tractor, he wanted to get into antique pulling and found himself a pair of Allis Chalmers tractors. This winter he has feverishly been working on a WD-45 as his puller, and a CA for his wife to pull. Bryan is an avid follower of the Podium Newsletter and has learned very quickly how to set up these tractors. He found some very interesting information about the WD-45 that is relevant for anyone who is into antique tractor pulling. His tractor features 16 forward gears in various ratios and we'll take a closer look at how this is done.

Bryan Haithcox (cont)

Bryan saw a post a while back on the Unofficial Allis Chalmers website in the chat forum (www.allischalmers.com). In that post is a picture of a load of AC high crop tractors that a guy hauled out of Louisiana. One of the tractors was a WD with a Thompson high crop kit. Back before Allis Chalmers was marketing true high crop tractors, Thompson of Louisiana made kits with larger rear wheels and front axles with taller spindles. These are primarily WC and WD high crops, but there were also WD-45 and D-17 kits built. The D-17 Series IV was the first factory built Allis Chalmers high crop tractor that carried that designation. Prior to that AC offered factory parts and tractors could be ordered with larger wheels, but there wasn't a designated "high crop" model or general order code.

WD with a Thomson high crop kit

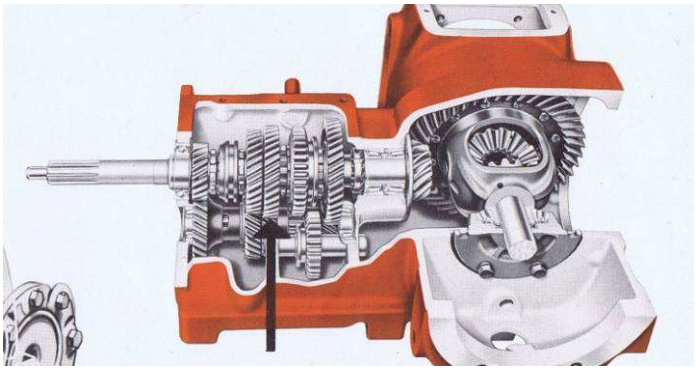
In that post there were several high crop tractor pictures, but the one in particular shown to the right is what sparked Bryan's interest. It is a late WD / WD-45 curved stick transmission with a WC transmission mounted in front of it. This configuration appeared to be either factory or dealer installed since the clutch and brake pedal mounting arrangement were also a part of the installation.



Bryan Haithcox (cont)

The picture at right shows a carrier plate on the front of the WD transmission to hold the front bearing in place. It also features an enclosed tube that houses the shaft between the two transmissions. When Bryan saw this, he decided to attempt to recreate it for his own pulling tractor. If you're familiar with AC tractors of this era, there was a major change between the WC and later WD.

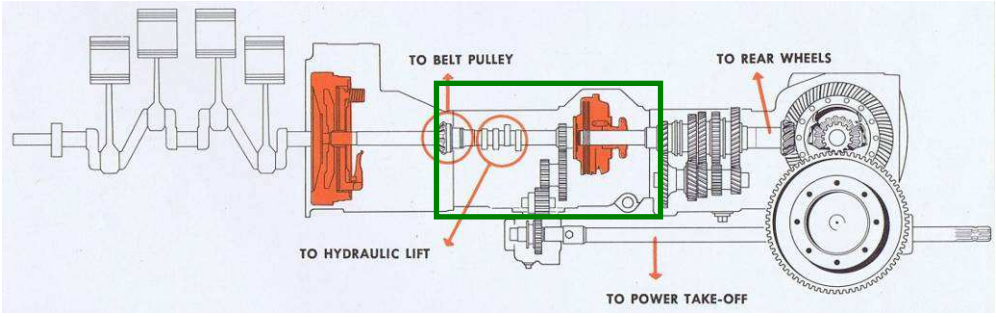
The WC's transmission was mounted right behind the engine bell housing and had a drive shaft of sorts to the rear end. This is because the WC used a truck style differential and rear axle. The WD and WD-45 transmissions were bolted directly to the rear end where the differential pinion was in fact part of the output shaft from the transmission.



WD-45 Transmission assembly

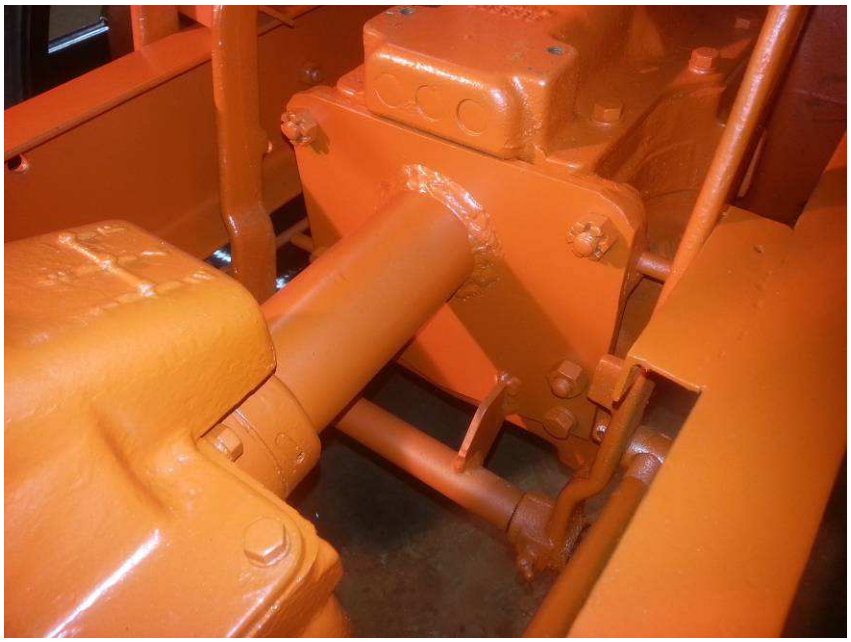
This is the reason that a combination as seen above is possible. The WD and WD-45 have a casting between the bell housing and the transmission that houses the hand clutch assembly. In order to make this combination work, Bryan had to remove the hand clutch housing and build the carrier plate and shielding tube. The WD-45 transmission has a long input shaft that is the same spline as the output on the WC transmission. Slam dunk.

Notice the diagram of the WD-45 drive train. The high-lighted center section is replaced with the WC transmission.



Bryan Haithcox (cont)

This picture shows the right hand side of the tractor. The transmission without the cover on it is the WC and Bryan has build the cover plate and tube for the WD-45 transmission. This fit is relatively easy since it only requires properly locating the front bearing in the WD-45 transmission.



At right is the final installation where a coat of paint has been applied. Notice the clutch and brake rod must be supported with tabs off the front transmission plate. According to Bryan the WC transmission is lighter than the hand clutch housing and internal components, which is good. So…with two transmissions how does this affect gearing and ground speeds? Well, the WC transmission becomes a range selector and the WD-45 transmission is the gear selector. The tricky part is figuring out which gears are the slowest and which are the fastest. This is where 'ol Zack can help.

Bryan Haithcox (cont)

As described in the ATPG: Gearing book, a range selector is a torque multiplier and thus the ratios for each WC transmission "range" is multiplied to get the final ratios. Below is how it all shakes out, and note the lever selection in the left hand columns. The gears are ordered from slowest to fastest. One interesting thing to note is that a WC transmission in 4th gear is a direct drive (1:1) ratio. That means all created gears are slower (or in between) factory WD-45 ratios. For tractor pulling, this is an incredibly valuable thing to have since small adjustments in gearing are now available. Bryan is running a stock 226 WD-45 engine and the tractor sits on 18.4-38 Firestone Field & Road tires. With the slower gearing, he'll have the torque to turn these big tires until he upgrades the engine later.

Gear ↓		WC Ratio	WD-45 Overall Drivetrain Ratio	Overall Ratio
WC Range	WD45			
1st	1st	3.70	83.63	309.43
2nd	1st	2.54	83.63	212.42
1st	2nd	3.70	53.22	196.91
3rd	1st	1.92	83.63	160.57
1st	3rd	3.70	39.88	147.56
2nd	2nd	2.54	53.22	135.18
3rd	2nd	1.92	53.22	102.18
2nd	3rd	2.54	39.88	101.30
4th	1st	1.00	83.63	83.63
3rd	3rd	1.92	39.88	76.57
1st	4th	3.70	18.08	66.90
4th	2nd	1.00	53.22	53.22
2nd	4th	2.54	18.08	45.92
4th	3rd	1.00	39.88	39.88
3rd	4th	1.92	18.08	34.71
4th	4th	1.00	18.08	18.08



Bryan Haithcox (cont)

And finally, here is the ground speed chart, similar to what is seen in the ATPG: Ground Speeds book. Again, notice the transmission lever selections on the left hand side, with gears properly ordered from slowest to fastest.

G – Factory Governed RPM
S – Standard RPM (USAP/NATPA)
1 – 10% over Standard RPM
2 – 20% over Standard RPM
3 – 30% over Standard RPM

											G				S	1	2	3
Gear ↓ RPM →		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1720	1892	2064	2236
WC Range	WD45																	
1st	1st	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.2	1.3
2nd	1st	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.7	1.8	2.0
1st	2nd	0.4	0.5	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.8	2.0	2.1
3rd	1st	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.5	1.6	1.7	1.9	2.0	2.2	2.4	2.6
1st	3rd	0.5	0.6	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	1.8	1.9	2.0	2.2	2.4	2.6	2.8
2nd	2nd	0.6	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.7	1.8	1.9	2.1	2.2	2.4	2.6	2.9	3.1
3rd	2nd	0.7	0.9	1.1	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.6	2.7	2.9	3.1	3.5	3.8	4.1
2nd	3rd	0.7	0.9	1.1	1.3	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8	2.9	3.2	3.5	3.8	4.1
4th	1st	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.3	3.6	3.8	4.2	4.6	5.0
3rd	3rd	1.0	1.2	1.5	1.7	2.0	2.2	2.4	2.7	2.9	3.2	3.4	3.7	3.9	4.2	4.6	5.0	5.5
1st	4th	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2	4.5	4.8	5.3	5.8	6.2
4th	2nd	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6	4.9	5.3	5.6	6.0	6.6	7.2	7.8
2nd	4th	1.6	2.0	2.4	2.8	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.1	6.5	7.0	7.7	8.4	9.1
4th	3rd	1.9	2.3	2.8	3.3	3.7	4.2	4.7	5.2	5.6	6.1	6.6	7.0	7.5	8.1	8.9	9.7	10.5
3rd	4th	2.2	2.7	3.2	3.8	4.3	4.8	5.4	5.9	6.5	7.0	7.5	8.1	8.6	9.3	10.2	11.1	12.0
4th	4th	4.1	5.2	6.2	7.2	8.3	9.3	10.3	11.4	12.4	13.4	14.5	15.5	16.5	17.8	19.5	21.3	23.1

The final question about this combination is whether or not it's legal under USAP rules. To allow bolt in engines, the rules simply state "no adapter plates" and the transmission and front end must bolt up. This rule is really to address the engine itself and not allow radical transplants. USAP rules also don't say much about transmissions other than they need to be factory castings. Since Bryan's tractor has the stock engine and transmission and is using factory components, I believe a combination like this is legal. An easy way to slow down a WD or WD-45 for 38" rubber!

Tough to tell even to the trained eye!

Building Rims for a New Era

On the last page is a picture of Bryan Haithcox's WD-45 with 18.4-38 tires on it. For these tires he fabricated a wide set of rims starting with a 16x38 set of dual rims. The dual rims had a ring welded to them for dual alignment. Being resourceful, Bryan carefully cut these rings off the rims, split the rims and welded in the rings. This made the rims 20" wide.

Original 16" rim on the right, rim with welded 4" ring on the left

Finished Rims

After widening the rims, Bryan went after a set of CAP Brothers rim centers by Pete Petznick (www.9bolthubs.com). The finished assembled rims are a little over 160lbs a piece, not bad for a 20" wide set.

Building Rims for a New Era (cont)

For the Massey 101, the rims will be similar to Bryan's although I was lucky enough to find a set of 18x38 rims. Since I will be running a set of 18.4-38's on 18's, these rims will work well as is with a set of CAP Bros centers. The assembled rims below with original centers are 200lbs a piece. The first project was removing the heavy centers. They were welded in place and after cutting the majority of the center away with a torch, the welds were cut with a 4-1/2" cutoff wheel and pieces removed. The remaining weld was ground smooth and the rim is ready.

18x38 rims. These rims are built heavy duty with near 3/16" thick material.

18x38 rim next to an original style 10x38 rim. Wow!

At right are the same rims with the centers removed. After removal, the rims weigh 128lbs a piece, meaning the centers were a whopping 72lbs! Using CAP Bros rim centers that are 24lbs, each rim will be almost 50lbs lighter than stock. That is nearly a 100lb weight saving overall. Definitely worth doing!

Wheelie Bars

There are lots of different designs out there for wheelie bars and just about all rules state they must be strong enough to withstand lifting the tractor on them with a floor jack. Some of the more common styles are triangular in shape, clamping around an axle or bolting to the axle. The last set I put on the 101 Twin Power came from Denny's Carb Shop. These are a common design that also incorporate weight brackets. For this go around with the 101 Senior build, I was thinking about going the same route but found something similar that was much more cost effective. Denny's is up to $225 a set for wheelie bars ($235 for Oliver). There is a guy in Lima, OH named Duane Derringer that makes wheelie bars during the winter that are high quality. Duane is a great guy, fellow puller and offers his wheelie bars at $150.00 a set. Now before I go any further, you are probably wondering why not just build a set as I've done in the past? These days my biggest enemy is time. Metal fabrication takes an enormous amount of time, so minimizing it is a good thing. Don't get me wrong, I do love iron mongering with the best of them, but sometimes it's easier to get a head start. Now, if you're an Oliver, Farmall or John Deere guy, you have it made when it comes to wheelie bars. Buy them, bolt them on and go have fun. If you are a MM, AC, Ford or Massey guy like me, it takes more fabrication to get things to fit.

The Massey 101 with Denny's Carb Shop wheelie bars

Wheelie Bars (cont)

These are Duane's wheelie bars. They are built from 2"x2"x.188" thick square tubing and weight about 37lbs a piece. This set is designed for a Farmall axle and Duane also makes them for John Deere axles that bolt right on. For the 101 Senior, there will have to be some light fabrication work to get them to fit, but we'll get there. All in all a high quality product at a great price. Keep in mind Duane builds these in the winter time and usually advertises on Yesterdays Tractors when he's working on them.

It also never hurts to have a template in case it's time for aluminum wheelie bars.

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Coming next month…

I want to hear from you! If you have feedback, requests or information you would like featured, please send an email to: zack@antiquetractorpullguide.com.

- 1st hook of the outdoor season
- Project 101 update – adding color
- Wheelie bar design
- And more…

April issue will be available 4/23/14

18.4-38 left, 15.5-38 right