



The Review

Fall 2021

Semesterly Newsletter by the Power Pullers Club at Iowa State University

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Diving inside the current progression of our new 2022 tractor!

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2021 Year in Review

Jacob Loutch, Previous A Team Leader

This past year has been full of ups and down. After taking a year off because of COVID restrictions, the Power Pullers Club at Iowa State University has pushed the edge of innovation with their 2021 tractor, Cylencer. Our competition, the ASABE (American Society of Agricultural and Biological Engineers) International 1/4 Scale Tractor Student Design Competition held in Peoria, Illinois, provided the perfect environment to showcase our achievements.

Unveiling a competition first, our team integrated the CY-shift three speed powershift transmission into their sub-compact tractor line. CY-shift utilizes four independent, hydraulically-actuated clutches to engage and disengage constant mesh gear sets to offer seamless shifting without a loss of power. Other key features for Cylencer included a fully suspended front axle and the all-new CY-Stick for tractor control.

Diving into the fully suspended front axle, it is evident that Cylencer offers many benefits for the rider. Linear guides allow for three inches of vertical travel as well as axial pivot for side-to-side oscillation. This, along with adjustable coil-over shocks, allows the entire front axle assembly to move which reduces shock loading as well as stress on the frame.

Looking into the CY-Stick, the Power Pullers Club looked towards ergonomics to craft our design. Gears can be shifted up and down with ease using the toggle switch located close to the operator's thumb. Also within close reach, the neutral and reverse buttons also offer next level ease of operation.



A Team Report

Dean Woodwell; A Team Leader

"The Power Pullers have been hard at work on the design of their 2022 tractor. The team has changed direction away from a powershift featured in the 2021 tractor. This year the team will be featuring a hydro-mechanical power split transmission. The Power Pullers do have some experience with power split transmissions from previous years tractor. However, this will be the first year with the transmission configured in an output coupled design. Other features that the 2022 tractor will have will be electric over hydraulic steering as well as an ackerman style front suspension. A tip-up op station will also be featured to allow for easy maintenance of the tractor."

"This semester the team has already gotten a large jump on the tractor build. Already having most of the powertrain components machined. Sourced components should arrive in mid-February putting the team on track to have the power split transmission on the test stand by the end of February. The tractors sheet metal order will be sent out before Christmas, with hope that these parts will be ready when the team comes back from Christmas break. It is an exciting time of the year, and the Power Pullers are looking forward to a spring semester of testing and building."

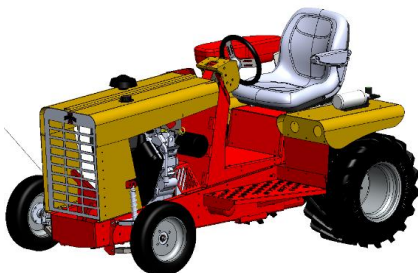
Electrical Advances

Nick Sandeen; A Team Executive Officer

"We have been working on developing our control model for our new transmission design and are starting to get a good idea of our control strategy. We are planning on using a raspberry pi to implement gain scheduling to improve the performance of the transmission and improve its performance across all operating conditions. We are also developing two of our displays in-house and are planning on developing a mobile service tool for a phone that allows for a Bluetooth connection to the tractor. Furthermore, we are improving last year's joystick design with a built in J1939 CAN bus communication."

Design and Machining

Jarred Jungles; Lead Machinist



"For this year's tractor, we have been machining parts heavily this semester, and nearly all of our in-house transmission components are complete. As of now, our current timeline for driveline completion is the end of February 2022. While the majority of our machining projects are for our driveline, we have taken it upon ourselves to produce suspension components and other minor parts. Before this semester ends, we hope to have our sheet metal order in, and begin to build the main portion of our tractor."



X Team Report

Cole Schafer; X Team Leader

Following the 2021 competition, the Power Pullers Club needed to assess a couple issues Cylencer experienced during the rigorous tests. Some of these issues include the three speed powershift transmission was not getting constant hydraulic pressure, the break clamps being ripped off the axle tubes, the tractor not transferring weight toward the back tires like we hoped, and there being some slop in the steering.

"After a third-place overall finish in Peoria this summer we are currently in the process of improving upon the design of the 2021 Cylencer. Our plans for this tractor include overall weight reduction, increasing power train efficiency, ergonomics improvements, and manufacturability and serviceability improvements. One of X-Team's additional goals for the upcoming semester is to try to get as much testing in before our next competition so that we can properly tune our transmission to perform optimally at the pulls this year."

COVID Year

Nathan Wilson, X Team Executive Officer

The Covid-19 Pandemic made it challenging for the Cyclone Power Pullers to maintain their desired relationship with individuals in the industry as well as the general public. Through the wake of the Pandemic, shop time was limited but our design initiative was not. Powering through the adversity, we brainstormed new ideas and possibilities for the next tractors to come. Once restrictions lifted, the Cyclone Power Pullers were able to participate in numerous outreach events. For instance, we participated in the ME welcome event on campus to gain the interest of Iowa State's Freshmen Class. Furthermore, we participated in the Iowa State University's Homecoming parade.

Fall Roundup

The Cyclone Power Pullers held our annual Sponsor Appreciation Pull on Saturday November 13th, 2021. The appreciation pull not only provided an opportunity for sponsors to see what they had so generously helped create, but also got our new members out for a first pull or two. Additionally, we would like to extend a thank you to all the family members and alumni that attended as well. Without them the current members would not be as knowledgeable about quarter scale tractors as they are today.





Executive Team

President **Nate Helgerson**
Vice President **Carl Howell / Nathan Wilson**
Treasurer **Tristan Thier**
A-Team Leader **Dean Woodwell**
A-Team Executive Officer **Nick Sandeen**
X-Team Leader **Cole Schafer**
X-Team Executive Officer **Nathan Wilson**
Webmaster **Kurt Brase**
Publicity **Hallie Sandeen**

Connect With Us!

We are continuously checking our email and posting on all our social media sites to give progression updates and to thank our sponsors! Give us a follow and stay in the loop.

Email:
cyclonepowerpullers@gmail.com

Website:
cyclonepowerpullers.org

Instagram:
@cpp_isu

Facebook:
@cyclonepowerpullers

LinkedIn:
linkedin.com/in/power-pullers-club-at-iowa-state-university

Sponsorship

To those who are already sponsoring the Power Pullers Club at Iowa State University, Thank You! To those who are not, it is never too late to become a sponsor. Without loyal sponsors we would not be able to produce a tractor and compete at such a high-level year in and year out. Donations of cash, parts, or supplies are always welcome. Sponsor request letters will be sent out the third week of September this year so please watch your mail. We need your help to make the Cyclone Power Pullers the international champs in 2017. Additionally, we are looking to compile a more extensive email list for quicker updates and easier contact with all companies. Please email us at cyclonepowerpullers@gmail.com with all addresses you would like added to our list.



2021 Sponsors

We would like to thank all our sponsors for their continued support in the Power Pullers Club at Iowa State University! We would not be the club that we are today without our great sponsors, thank you again.

Full Pull Club:

DR. STUART BIRRELL



Cardinal Club:



Gold Club:



Silver Club:



Bronze Club:

