2023 Collegiate Wind Competition

OSU CYCLONE COWBOYS

SCHOOL OF
ELECTRICAL AND
COMPUTER ENGINEERING
College of Engineering, Architecture and Technology

FINAL METRICS REPORT

Connection Creation Team:

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Faculty Advisor:

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Recruitment Plan Outcomes

Metrics

Team numbers and growth

- August 2022 (Original Members): 10 team members
- December 2022: 18 team members
- January 2023: 24 team members
- April 2023: 28 team members

Grade levels of team members

- Seniors: 22 team members
- Juniors: 3 team members
- Freshmen: 3 team members

Composition of Oklahoma State University: 25,359 enrolled students

- Gender
  - Female: 51.83%
  - Male: 48.17%
- Race/Ethnicity
  - White: 65.07%
  - Multiracial: 9.75%
  - Hispanic: 8.58%
  - International: 5.89%
  - American Indian/Alaskan Native: 4.34%
  - Black: 4.05%
  - Asian American: 2.15%
  - Native Hawaiian/Pacific Islander: 0.08%
  - Unknown: 0.09%

The Cyclone Cowboys

- Gender
  - Female: 39.29%
  - Male: 60.71%

Race/Ethnicity

- White: 75%
- Asian: 10.7%
- Hispanic: 7.1%
- Black: 3.6%
- American Indian/Alaskan Native: 3.6%

Breakdown of majors in the team

- Mechanical Engineering: 7 team members.
- Mechanical Engineering Technology: 5 team members
- Civil Engineering: 4 team members
- Electrical Engineering: 3 team members
- Industrial Engineering and Management: 3 team members
- Mechanical and Aerospace Engineering: 2 team members
- Environmental Engineering: 1 team member
- Biosystems Engineering: 1 team member
- Chemical Engineering: 1 team member
- Environmental Science: 1 team member

Reflection on Plans vs. Results

The original plan for recruiting members to the Cyclone Cowboys involved a combination of several outreach events throughout the year to educate people about our project and wind energy, such as tabling events and open house meetings, and social media to promote our team. With tabling, we would attend on-campus events or plan our own to set up a table and present to the people attending about joining our team. For open house events, we wanted to invite people to attend our team meetings so they could see how we operate and get a feel for the structure of our team, but that wasn't something our team could execute this semester. During the year we tried to follow this plan to help us with recruiting, however, we ran into a few complications. Deadlines for both Senior Design and competition deliverables regularly interfered with the planning of these recruiting events and only allowed us to do a few each month during the spring semester. Overall, the number of team members increased significantly through the course of the competition, and we hope to improve our recruitment plan for the future.

Social Media

Metrics on Account Growth

To spread awareness about our project, we created three social media accounts: Instagram, LinkedIn, and Facebook. The Cyclone Cowboys also created a website that details all aspects of our project. The following is a list of our social media platforms with number of followers, number of posts and likes, and how this grew throughout the year:

Instagram

- Followers: 206
  - 294% increase since January
- Posts: 12
- Reels: 1
- Stories: 10
- Likes: 266

LinkedIn

- Followers: 41
- Posts: 8
- Likes: 46

Facebook

- Followers: 28
- Posts: 14
- Likes: 24

Reflection on Plans vs. Results

The first objective in the Connection Creation Action Plan was to document turbine design, project development, and the team's progress and challenges. The first part of the plan was to introduce the team. This was done by posting the whole team and then making highlights for each sub-team, namely the Connection Creation Team, the Turbine Design Team, and the Project Development Team. Each member was highlighted by detailing their major and role in the project. The social media also showcased different events the Cyclone Cowboys attended and reminders for them. Each post was posted on each platform, but Instagram also included more casual content. The Outreach Team initially planned to use social media and the website for the Cyclone Cowboys to announce advancements of the team, which proved harder than planned because the team did not want other universities to see the full design of the turbine. We instead posted small snippets and various parts of the turbine. The team utilized social media to reach members of the local community and grew our social media significantly, which was a part of the initial Outreach Plan. In the initial plan, the date to create a LinkedIn account was much earlier than the actual execution, which stunted growth on that platform. Overall, the plans for social media development and growth were completed and growth expectations were exceeded.

Interviews

Industry Connections Made Metrics

Jarrod Beckstrom – Apex Clean Energy Development Manager

- 3 people attended the interview.

On November 30th, 2022, the team met with Jarrod Beckstrom who is currently a development manager at Apex Clean Energy. Jarrod has a lot of experience and has been involved in all parts of the wind industry. He initially got a degree in Journalism from the University of Denver but went back to school and got an associate degree in Wind Turbine Technology at OSU-OKC. He was a wind turbine technician for about 6 months and then became a site manager where he managed multiple technicians, warehouses, and turbines in Oklahoma. He left his first company NextEra and is now a development manager for Apex Clean Energy where he gets to talk to landowners and work in the early stages of wind farm development.

Taewoo Nam - Toyota Mothership Project

- 3 people attended and conducted the interview.

On December 5th, 2022, the Outreach Team interviewed Taewoo Nam at the aerospace research lab on Oklahoma State's campus. Taewoo got his PhD from Georgia Tech in Aerospace Engineering and began in the industry doing research for the Tokyo military and Georgia Tech after he graduated. He did a fair amount of aerospace integration for 25 years before beginning his work for Toyota. He now is working on a project called the Mothership Project which is a kite system with tethers that can be used for wind energy harvesting and to accurately predict the weather in real time, which he showed during the visit.

Jaime McAlpine – Chermac Energy Corp. Project Manager

- 5 people attended the interview.

On October 17th, 2022, the team conducted an interview with Jaime McAlpine, PE. Jaime got his degree in petroleum engineering from Oklahoma State University and started his career in the wind industry in 1999. He manages the development of windfarms and his main duty is making sure that there are no fatal flaws in the turbines to protect the people that work on them. He gave the team valuable insight on how the industry has grown and changed, and the current state of the industry.

Donnie Joe Worth – Orsted

- 7 people attended the interview.

On November 7, 2022, the teams was able to speak to OSU alumni Donnie Joe (DJ) Worth. He studied chemical engineering and got a master's degree in the United Kingdom. With Orsted, he worked on large scale projects in wind and solar battery storage and getting construction ready. He was a project developer for Orsted.

Cindy Bambini - CannonDesign – Vice President, Business Development Leader

- 7 people attended the interview over Zoom.

On March 23, 2023, the team had the privilege of speaking to Cindy Bambini, the Vice President, and Business Development Leader of CannonDesign. This connection formed at a Professional Development Conference, the IISE Regional Collegiate Conference. She is currently a field technician in the wind energy industry. She attended the University of Missouri and is an industrial engineer. She "lucked into" the wind energy industry instead of pursuing it. Her experiences come from an architectural engineering firm that is focused on sustainability and from a solar company in the eastern part of Missouri.

Reflection on Value of Interviews

Overall, being able to hear about the industry currently and how it has changed really benefits the Cyclone Cowboys team and its understanding of the industry. This experience was extremely valuable for the Outreach Team, but it would be a lot more beneficial if more team members were available to attend the meetings. The interviews were not as efficient as they could've been if more people on different teams had been able to attend the interviews. The knowledge we gained about the current state of the industry will be very beneficial to the Outreach Team members in the competition, and having these connections will be extremely beneficial moving forward.

Outreach Events

Westwood Elementary School

The Cyclone Cowboys had the opportunity to conduct an outreach event to expose Westwood Elementary students to engineering principles in wind energy. The team visited a Gifted and Talented classroom to introduce them to mechanical and electrical energy and construct model wind turbines using KidWind kits. The kids were able to learn about renewable energy while practicing critical thinking and engineering skills.

- Number of Participants: 75

- Number of Cyclone Cowboys: 11

CEAT Club Fair

To kick off the new semester, the College of Engineering, Architecture, and Technology (CEAT) hosts a club fair to showcase the different organizations that students can get involved in at Oklahoma State University. A group of Cyclone Cowboys members hosted a booth at the event in a recruitment effort.

- Number of Participants: 10
- Number of Cyclone Cowboys: 4

Recruitment Booth

In a well-traveled area on Oklahoma State University's campus, the cyclone cowboys set up an outdoor booth to draw interested students to learn more about the project. The team hoped to use this avenue to spread awareness about the DOE competition and get a wide range of disciplines, not only engineers, involved.

- Number of participants: 50
- Number of Cyclone Cowboys: 5

Creativity Fest

The Cyclone Cowboys spent time sharing our design project with Elementary and middle school students at OSU for a creative problem-solving competition called Odyssey of the Mind. Our design team brought prototypes of our turbine as well as a poster describing our project development and outreach work to inspire the students to think beyond the scope of their individual projects and look more into renewable energy and interdisciplinary engineering.

- Number of Participants: 50
- Number of Cyclone Cowboys: 6

American Institute of Aeronautics and Astronautics Meeting

The Oklahoma State AIAA meeting consisted of Mechanical and Aerospace seniors presenting to the club the various design projects they have been working on. It was partly a way to inspire the undergraduates and partly a way to network. Two members of the Cyclone Cowboys spoke about the aerodynamics involved in the project as well as the manufacturing and testing required to produce a working turbine. From this event, we were able to network with one of the professors at OSU regarding recruiting members of the Cyclone Cowboys to work on an NREL sponsored event capturing wind turbine measurements near the Oklahoma DOE research site.

- Number of Participants: 50
- Number Cyclone Cowboys: 2

Strength of Materials Class

By reaching out to a previous engineering science professor, some of the students in the Cyclone Cowboys were able to present and recruit in three different Strength of Materials classes. Because this class is taken by a variety of engineering majors, we talked about the multidisciplinary nature of our project and the inclusivity we try to exhibit. Unfortunately, not many underclassmen reached out after the presentation, but the main objective for us was to spread awareness instead of force participation.

- Number of Participants: 150
- Number Cyclone Cowboys: 4

Reflection on Events

Overall, the outreach events were very successful at spreading awareness about the Cyclone Cowboys as a club on campus while also promoting wind energy and engineering to local communities.