

Drivetrain Design

Learn about the intricate design aspects of drivetrains

- Swerve
- Frame
- Driving Characteristics

Swerve

Knowledge dump at the moment, will be refined soon!

- Typically use X2i (The i is for inverted) for protection of the swerve motors
- Swerve X2c - Smaller than X2t, using Kraken X44
- swerve X2t - slimmer and assymetrical gearbox
- Swerve good at climbing inclines
- put swerve images on wiki
- Swerve bolted by corner mount or tube mount
 - Tube mount (on alpha) can tell since the 2x1s touch (Pro- strong) (Con - Loss of wheel base, making less stable robot)
 - Corner mount has 2x1s that don't touch (Pro - Wheel base spread out more, allowing for better speed and traction) (Con - Less strong, likely to bend plates)
- Placing 2x1s under swerve mount allows for lower center of grav
- Placing 2x1s on top of mount good for going over rough terrain and integrating under the bumper intakes (like in 2024)

Frame

- Need 4 pieces of 2x1 for base
 - .100 or thicker = thick wall (Good for chassis for durability and high impact surface)
- Bellypan
 - Has many grommet holes to allow for elec components to mount, and has holes for mounting onto chassis and save weight. Known as pocketing
 - Laser cut by sponsors
 - Typically 1/16" to 1/4" in thickness
 - Thicker bellypans have smoother driving due to lower center of mass (COM is VERY important)
- Mounting tubes integrated in the middle for mounting subsystems and increasing overall durability
 - Connected to core 2x1s by gussets
- Place battery first when designing drivetrain as it is the heaviest so you can take COM into account (important for deciding how smooth your robot can drive)
- Tungsten sheets are heavy and good for COM, but very expensive (Insert mcmaster carr tungsten sheet price pic)
- When designing your drivebase, your main goal should be maximizing COM while maintaining efficient mass to incorporate other subsystems in the future
- Acceleration is prioritized in games which require lots of change of direction and a need for a fast topspeed accumulation
- Tall robots which have a need for speed require heavier drivebases to maintain balance
- If geared too tall, it means it takes too long to reach topspeed
 - Robots geared too high will do better with pushing (kinda like torque) while bots geared for top speed won't (Speed is inverse of torque)

Driving Characteristics

(Sprint dist calc pic here) *Add stuff from previous pages that apply here like gearing high and acceleration*

- Swerve is built for maneuverability rather than a pushing tank, which would be tank drive
- Overall Idea --> Select sprint dist, obstacles, how you want to mount the swerves (corner or tube)