***Drivetrain-***

We researched various types of ways to power the vehicle manually, where our primary focus was not to use chain and sprocket system ,as it was not encouraged in the competition.

**Belt Drive System.**

While researching about belt drives, we found that there are several types of belt drives like: -

--Round Belt

--Flat Belt

--V shaped belt

--Toothed belt

--Link belt

For using the belt drive systems, its-

|  |  |
| --- | --- |
| Advantages | Disadvantages |
| * Cost-effective * Simple to use * No need for parallel shaft * Come with jam protection * Load fluctuations are shock absorbed * Reduce noise and vibrations | * It is not possible at places with high torque applications * Not compact * Greater wear and tear * Inflict heavy load on shafts * Angular velocity not constant * Operating temperature at -35° to 85°C * Velocity not constant due to V-belt slip |

**Gear Drive System.**

For gear systems and types of them, their advantages, and disadvantages were as follows: -

|  |  |
| --- | --- |
| Advantages | Disadvantages |
| * They are non-slip drives * Mechanically strong * Deliver high transmission efficiency * Ideal for low, medium, and high-power transmission * More compact compared to belts and chains * They can transmit motion over small centre distance of shafts | * Cannot be used for shafts with large centre distances * Not ideal for large velocities * Need regular lubrication * Multiple gears raise machine overall weight * They have no flexibility |

Overall, after thorough comparison, consideration and as per our need, we concluded that **gearboxes** were better than any other way to power our rover.

**DESIGN**

The parts required in building the drive train will be bevel gears, gearbox, and differentials. There are two modes of transmission in this proposed model of drivetrain. One is high rpm and moderate torque associated with the front axle and the other is low rpm and high torque associated with the rear axle. The rear wheels have larger wheel diameter than the front wheels resulting in more grip and torque, whereas the front wheels will be relatively smaller in size resulting in more rpm helping in traversing the course faster.

A picture containing metalware, gear

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The type of gear which will be used in this configuration is a hypoid gear as it suits the requirements and will not slip when in use. Also, this is the best option when it comes to fold the chassis.

For the front axle, we will attach the pedals to the gearbox which further will be connected to the differential which will be connected to the wheels. For rear axle, we have planned to attach the pedals to the gearbox. This gearbox will be connected to the differential at the back via shaft. This differential will be further connected to the wheels. The rear gearbox will have a higher gear-ratio as it is required to give more torque whereas the front gearbox will have a lower gear-ratio to attain a higher rpm.