

Chain Transmission System in ATV

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Abstract: - The efficient transmission system for the mega ATV is the primary emphasis of this project, both in terms of design and manufacture. an all-terrain vehicle (ATV), sometimes referred to as a quad bike, that is powered by low tire pressure and has a handlebar for steering control and a seat that the user sits on. ATVS are designed to be easily operated by a single person. The rider sits on the vehicle and drives it like a motorbike on non-motorized roads. These projects' main goal is to choose the best transmission system for the ATV in order to make the most of the engine's maximal power output. Currently, the ATV is driven by a belt, which has numerous advantages but also presents a number of possible issues that should be resolved. The main issue with belt drives is power loss, which can range from 9% to 15% and can get worse if the belt slips. high creep and slippage cannot be utilized to get the driven pulley's velocity ratio to remain constant. Currently, the ATV is belt-driven, which has many advantages but also presents a number of possible issues that should be taken care of. The main issue with belt drives is power loss, which can range from 9% to 15% and can get worse if the belt slips. high creep and slippage cannot be utilized to get the driven pulley's velocity ratio to remain constant. The goal of the current effort is to reduce torque and power losses in ATVs by introducing chain transmission.

1.Introduction

The American National Standards Institute (ANSI) defines an all-terrain vehicle (ATV) as a vehicle with low pressure tires, handlebars, and a seat that the operator straddles. It is also referred to as a light utility vehicle (LUV), a quad bike, or a quad (if it has four wheels). Its name suggests that it is built to tackle a greater range of terrain than the majority of other vehicles. While it is illegal on the streets in some nations, it is not in the majority of US, Canadian, and Australian states, territories, or provinces. ATVs are designed to be operated by one person, according to the current ANSI definition; however, some models, known as tandem ATVs, are designed to accommodate one passenger in addition to the driver. These vehicles are operated and ridden like motorcycles, but at slower speeds the extra wheels provide greater stability for the rider. While the majority have three or four wheels, there are six- or eight-wheel (tracked) variants available and have been in the past for certain uses. To differentiate the different vehicle types, multiple-user equivalents with side-by- side seats are referred to as utility terrain vehicles (UTVs) or side-by-sides. All-terrain vehicles (ATVs) are specialized automobiles that need to be handled with caution, responsibility, and sound judgment. They are helpful for venturing into remote areas, but if handled carelessly, they can harm the ecosystem. Additionally, in order to handle them properly on rocky terrain, training and practice are needed. According to studies, the majority of ATV mishaps happen when the rider runs into an unforeseen impediment, like a ditch or a boulder. It's vital to keep your speed at a safe level. Attend an authorized ATV course to prepare yourself and your family if

you plan to hunt with an ATV. Make sure you have permission from the landowner before using an ATV for hunting on private property.

2.LITERATURE REVIEW

Niels Fuglede And Jon Juel Thomson (IRJET) (Kinematics and Dynamic Modelling and Approximate Analysis of Roller Chain Drive)

This study article discussed the most effective way to transmit power within a vehicle. Because of their excellent energy efficiency, huge power capacities, timing capabilities, freedom in selecting the shaft center distance, and ease of installation and maintenance, roller chain drives are used for power transmission in many mechanical systems. The ongoing research for the usage of the chain drive is focused on the undesired noise and vibrations found in the roller chain drive.

C. Pereira, J. Ambrosis and A. Ramalho (Dynamics of Chain Drive Using Generalised Revolute Clearance Joint Formulation)

This study highlighted the roller chain drive as well as the sprocket and roller chain's positive power transmission capacities. Most of the time, the chain is used for power transmission because of its positive power transmitting capacity. Additionally, they discussed the production process and the roller chain's dynamic behaviour in this research study.

S. Mahalingam (Polygonal Action of The Chain Drive)

This research study explained the polygonal impact in detail and explained why it is important to take into account when choosing or constructing a chain and sprocket. This study report provides a detailed estimate about the polygonal effect.

Yong Wand, Desheng Ji and Kai Zhan (Modified Sprocket Tooth Profile of Roller Chain Drive)

This study report explained how the nonconjugated meshing features' polygonal action and meshing impact harm the tooth profile. The novel tooth profile that is being developed with less polygonal effect and

meshing influence under high-speed conditions is the basis of this research work.

3.OBJECTIVE

- Replacing the ATV's belt drive with a chain drive will increase its efficiency, which is the project's primary goal.
- Minimize the power and torque loss caused by the belt drive on the ATV.
- It has been replaced with chain because of the considerable power loss in the belt which is 15% to 14% and the chain, which is roughly 3% to 4%.

4.Methodology

- i Research on several ATV transmission system types.
- ii Compute the Power Loss.
- iii Choose an appropriate transmission scheme least amount of electricity loss.
- iv A particular chain drive transmission.
- v Design of Sprockets and Chain Using SolidWorks.
- vi An experiment with the project.
- vii Finalized as the best solution to transmit power and torque in ATV at minimum loss, the chain drive was chosen after a successful project test.

Table 1 Proposed parameters

Designation	Parameters to achieve
Center distance	280 mm
Overall speed ratio	4:1
Speed ratio	4:1
Torque at wheel	14.58Nm

5.PROPOSED DESIGN

Due to size restrictions, we employed a combination of sprockets to accomplish our goals in the available space.

Table 2 Chain length centre distance

Sprocket	14	43
Chain Length	41 links	

Fig 1. Driver Sprocket

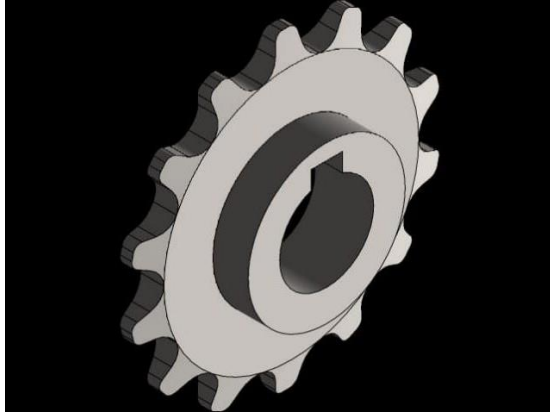


Fig 2. Driven Sprocket

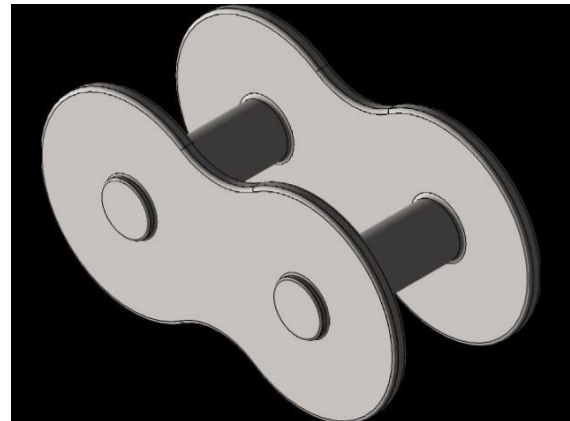


Final results are displayed in the table below once the calculation was completed.

Table 3 Actual Parameters achieved

Parameter	Calculated specification
Approx distance	282mm
Overall speed ratio	4:1
Speed ratio	4:1
Torque at wheel	14.47Nm

Fig 3. Chain Link



6.Result & Discussion

- To determine how many chain links and teeth will be needed on the sprocket, the chain length center distance was calculated.
- The goal of calculating the speed ratio and overall speed ratio was to maximize the torque and power output on wheels.
- Torque on the wheel was calculated to check the efficiency of the chain transmission

7.CONCLUSION

All-terrain vehicles (ATVs) with chain transmission systems provide a reliable and effective way to transfer power from the engine to the wheels, resulting in top performance over a variety of terrains. The chain transmission system offers riders better control, smooth gear shifting, and dependable torque delivery thanks to its creative design and sturdy construction. A chain transmission system gives you the power and agility you need for an exciting ATV ride.

The chain transmission system offers consistent torque delivery, seamless gear shifting, and improved control for riders thanks to its creative design and sturdy build. The power and agility required for an exhilarating ATV experience are provided by the chain transmission system.

8. Reference

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