

# DESIGN ANALYSIS AND FABRICATION OF LOAD CARRYING WALK, CLIMB AND DESCEND MECHANISM

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## ***Abstract:***

**In this undertaking a kinematic strolling robot roused by human movement is talked about and the mechanical designing isn't more engaged with advanced mechanics since mechatronics and mechanical technology found an immense application in executing the idea of kinematic strolling system. To actualize the strolling example of people a four bar linkage based coupler bend is created for the design and its presentation. The strolling exhibitions of the robot are carefully identified with the movement of the tip of every leg component. Servo engines are utilized for every leg of the robot the for turning and the other engine for accomplishing like human strolling design. The created kinematic and dynamic models have been analyzed for stride age of kinematic walker system. In this task kinematic strolling robot has been plan, examination and creation has been talked about.**

## **1. Introduction**

The two most regularly noticed stride design in human motion are strolling and running, which are both acknowledged with similar arrangement of two legs. Since the time the actual formation of the word Robot, individuals believe that robots should look and act like people. Yet, as of not long ago, this has just been a dream. By replicating to the actual design of legged creatures, it very well might be conceivable to improve the exhibition of portable robots. To give more steady and quick walkers can execute the applicable organic ideas in their plan. Making a genuine robot that can really walk like a human, or distantly seem as though a human, has been caught in the domain of sci-fi films and books. Despite the fact that the new astounding humanoid automated advancement endeavors have been directed by huge companies and examination colleges with multimillion dollar spending plans, humanoid robots can really be worked at home by the normal individual. While there is no single right meaning of "robot" a normal robot will have a few or conceivably, robots are falsely made, robots can detect its current circumstance, and control or cooperate with things in it, robot has some capacity to settle on options dependent on the climate, regularly utilizing programmed control or a pre-customized arrangement, robots are programmable, robots moves with at least one tomahawks of turn or interpretation, robots makes adroit composed developments, robot moves without direct human mediation. The step examination and reproduction is introduced by dissecting the aftereffect of appropriate PC recreations in various strolling conditions. A portion of the walks can be noticed and examined at various velocities of the robot body, separately, while a transient conduct is acquired between these breaking point conditions. The intricacy of a reasonable strolling robot, it's anything but a simple errand to remember the inertial terms for the demonstrating. The vast majority of the chips away at strolling elements were directed with a worked on model of legs and body. However, to have a superior comprehension of significant issues of strolling depend on a practical strolling robot configuration are fundamental. Here, an endeavor has been made to do plan, investigation and manufacture of burden conveying walk, climb and plummet system

## **2. Problem summary**

The military bases, explosive ordinance disposal units which faces problem like bomb or mine explodes. So the following problems can take place by use of this kinematic walker robot.

## Problem Identification

- In this kinematic walker mechanism it doesn't have the ability to carry the load because it have low strength of material can be used to manufacture.
- It doesn't have to climb or descend the steps (above the length of 20 cm).
- Earlier kinematic walker is take the power from electric current through wires, so it have a limit to do work.
- Corrosion may occur due to the mechanism applied in sand terrains.
- Create wear and tear between the links

## 3.Literature Review

[1]Bhavik J Parekh,et.al., Bhavik J Parekh et al. made an examination on sports is one of the regions where there is an incredible breadth for development and computerization. Pitch checking is the undertaking which is tedious, monotonous and needs manual support. The possibility of the paper is to automatize the assignment of pitch stamping. Theo Jansen's component show better portability while proceeding onward harsh landscape over wheeled robots. The enhancement is set up to limit the energy enter and expand the throughput. This plan is one of the great options over the current frameworks for pitch checking. This paper may reveal insight into the future upset of sports ground checking

[2]D Deepak,et.al., D Deepak et al. presents a writing outline of mechanical designing isn't more associated with mechanical technology since mechatronics and mechanical technology found an immense application in executing the idea of running a robot model utilizing servo engines and drives, since it needs more measure of energy to run the robot model. The two six legged walker is connected by utilizing joint instrument and by coupling two kinematic walker with independent engine for every walker. By utilizing separate engine we can run every walker in wanted position like front and back, along these lines we can ready to control the walker to turn left and right movement.

[3]Gabriel martin nelson,et.al., Gabriel Martin Nelson et al. made a survey in his report named Learning about Control of Legged Locomotion utilizing a Hexapod Robot with Compliant Pneumatic actuators; he portrays endeavors to get an organically propelled hexapod robot, Robot III, to walk. Robot III is a pneumatically impelled robot that is a scaled-up model of the *Blaberus discoidalis* (cockroach). It utilizes three-way solenoid valves, driven with Pulse-Width Modulation, and off-the-rack pneumatic chambers to impel its 24 levels of opportunity. Single-turn potentiometers and strain gage load cells give joint point and three pivot foot power detecting individually.

[4]Gregorio Romero Rey,et.al., Gregorio Romero Rey et al. Made a survey since forever ago, the individual has attempted to adjust to the climate and has could defeat impediments in an agreeable and successful manner. There exist components with the capacity to proceed onward sandy or unpleasant landscape, where it is exceptionally hard to move or even for all intents and purposes inconceivable for frameworks that move by utilizing wheels. Hence, it is viewed as indispensable to consider and examine these motor constructions to give a progression of rules pointed toward improving their plan for application in sandy or desert regions. In this work, and subsequent to investigating the potential benefits of the strolling systems, just as contemplating other existing ones, we will embrace the plan of one of them that can be handily moved. I will be minimal effort and easy to gather so it will actually want to produce the examples that are required in the different spots where you need to utilize it. Such an excess of taking into ac-check diverse central boundaries.

[5]Gregorio Romero,et.al., Gregorio Romero Rey el al. Made an audit, International meeting on The Digital Transformation in the Graphic Engineering, 123-131,( 2019)Since the very beginning, the individual has attempted to adjust to the climate and has could beat snags in an agreeable and successful manner. There exist components with the capacity to proceed onward sandy or unpleasant territory, where it is exceptionally hard to move or even essentially unthinkable for frameworks that

move by utilizing wheels. Subsequently, it is viewed as fundamental to consider and examine these motor constructions to give a progression of rules pointed toward improving their plan for application in sandy or desert territories. In this work, and subsequent to investigating the potential benefits of the strolling systems, just as examining other existing ones, we will attempt the plan of one of them that can be effectively moved. I will be minimal effort and easy to gather so it will actually want to produce the examples that are required in the different spots where you need to utilize it4.Experimental Setup

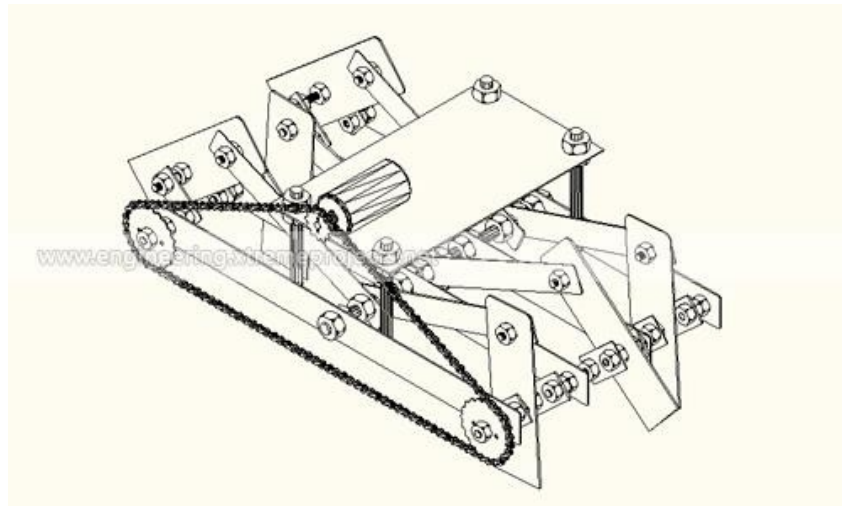


Fig.1 Experimental setup of kinematic walker mechanism

#### 4.Design model

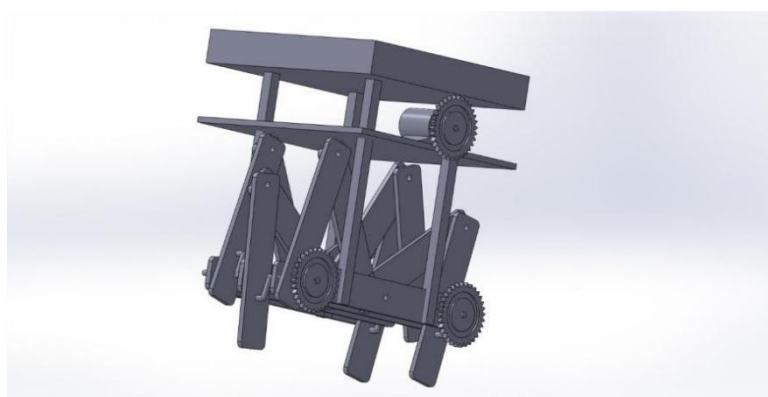


Fig.2 ISO view of the model

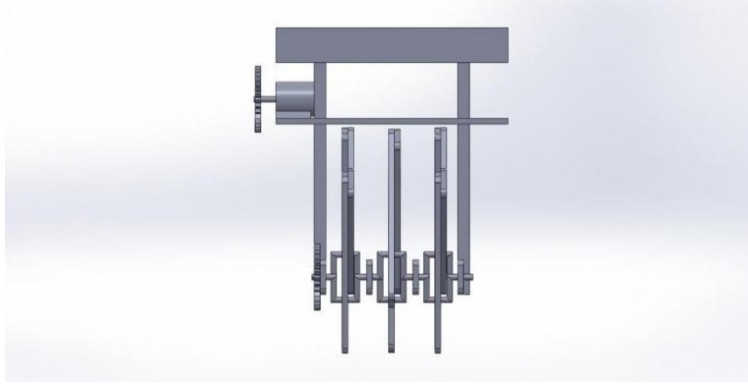


Fig.3 Side view of the model

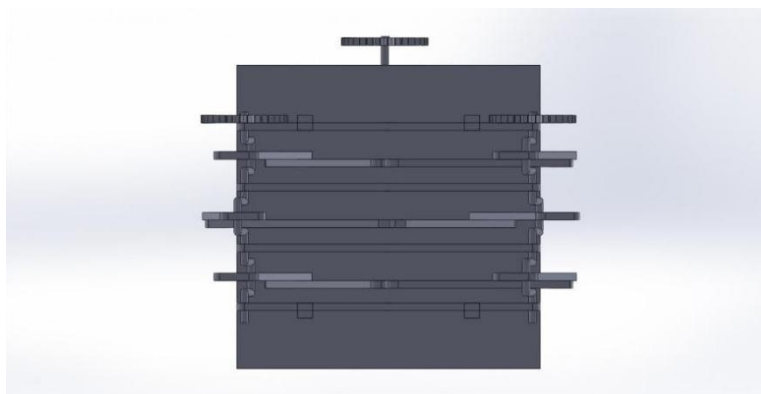


Fig.4 Bottom view of the model

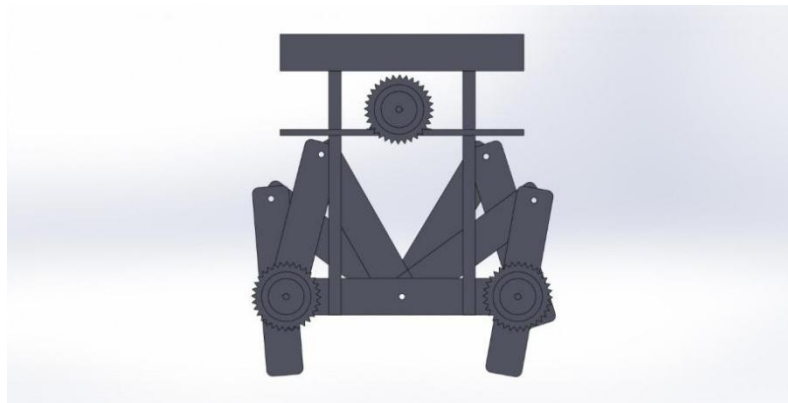


Fig.5 Front view of the model

### 5.Design calculation

#### CALCULATION OF DEGREES OF FREEDOM

In general, number of degrees of freedom of a

mechanism is given by,  $(n = 3(l - 1) - 2j)$

Where

n – Degree of freedom

l – Number of links

J- Number of binary joints

We have,  $l = 6, j = 7$

Hence, Degree of freedom

$$n = 3(6-1) - 2 \times 7 \quad n = 15 - 14$$

$$n = 1$$

#### CALCULATION OF GEARS

$$\text{Pitch Diameter, } d_1 = m \times Z_1$$

$$= 1 \times 14 = 14 \text{ mm}$$

$$= 15 \text{ (is the standard diameter}$$

from the data hand book)

$$\text{Diametric Pitch, } DP = Z_1/d_1$$

$$= 14/15 = 0.93 \text{ mm}$$

$$\text{Outside Diameter } D_o = (Z_1+2)/DP$$

$$= (14+2)/0.93 = 17.2 \text{ mm.}$$

$$= 18 \text{ mm}$$

$$\text{Addendum, } a = 1/DP$$

$$= 1/0.93 = 1.075 \text{ mm.}$$

$$\text{Dedendum, } d = 1.157/DP$$

$$= 1.157/0.93 = 1.24 \text{ mm.}$$

### 6. Working

The essential working guideline of the six legged mechanical is that the rotational development of the engine is changed into the (legged) by walking development of the automated. There might be an engine associated by the chain capacity to the prod instruments plan of the gadget. The prod hardware shaft is snared to the legs of the walking robot, all together that the robot can change over the rotational movement into the direct movement of the legs. The legs are interconnected with each other so that there exists the straight development of the legs and the legged movement. The DC engine can run through the battery power convey

### 7. Future scope

This component can be made more adaptable by utilizing diverse connection lengths for front, middle and rear legs. Insight can be actuated by acquainting Sensors and vision with improve the adequacy of this robot in future. Scope of movement and minutes accessible at each joint are the best worry as it is significant for accomplishing position and creepy crawly like strolling. Further advantages of strolling robots are low force utilization and weight and the base measure of actuators should consequently be utilized

### 8. Conclusion

In this venture, a six legged robot is created. It is utilized to venture over checks, climb steps, or travel into territories that are at present not open with wheels without chip control and other actuator instruments. It is hard to contend with the proficiency of a wheel on a smooth hard surface yet as the unpleasantness of the way builds this linkage turns out to be more reasonable and wheels of comparable size can't deal with snags that this linkage is prepared to do. Further, turning arms could be utilized to improve

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