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Design and Fabrication of Robot Using Klan Mechanism

Dr Harish Harsurkar[1], Anuj Alok[2], Khan Mohd Wasim Suleman[3], Mukadam Taukir Parvez[4]

[1]Professor Husain Shaikh, Mechanical Engineering, V.P.S Engineering College Lonavala Pune, India[2]Second Author Department & College

[2345]Undergraduate Student, SPPU University, Pune, India

Abstract -In this paper, discuss the spider mechanism (Klan's mechanism) for any random movements, whenever the transformation by wheel is not possible. In these aspects, the proposed assembled spider mechanism (Klan's mechanism) for any random movements in hectic places. It can step over curbs, climb stairs or travel areas that are currently not accessible with wheels. It is very useful to the patrolling purpose in army. The most important benefit of this mechanism is to deduct the complicated areas easily with the mechanisms. In this mechanism links are connected by pivoted joints and convert the rotating motion of the crank into the oscillatory motion absence of others

Key Words:Torque , Motor Speed, Length , Gravity, Force Coefficient of friction

1.INTRODUCTION

The remote control spider mover robot is based on Klan's mechanism. The Klan mechanism is a planar mechanism designed to simulate the movement of legged animal and replace the wheel rotating motion. The linkage consists of the frame, crank, two pivoted rockers, and two couplers all connected by pivot joints. It has 6 links per leg 180 degrees of crank rotation per stride. The 2 legs will rotate by a wheel in clockwise rotation of crank. The step height is achieved by rotating the connecting arm which is attached to the crank on one end and the middle of the leg on the other. It pivots on a grounded rocker. The proportions of each of the links in the mechanism are defined to optimize the linearity of the foot for one-half of the rotation of the crank..

2. Body of Paper

The Klan mechanism is a planar mechanism designed to simulate the movement of legged animal and replace the wheel rotating motion. The linkage consists of the frame, crank, two pivoted rockers, and two couplers all connected by pivot joints. It has 6 links per leg 180 degrees of crank rotation per stride. The 2 legs will rotate by a wheel in clockwise rotation of crank. The step height is achieved by rotating the connecting arm which is attached to the crank on one end and the middle of the leg on the other. It pivots on a grounded rocker. The proportions of each of the links in the mechanism are defined to optimize the linearity of the foot for one-half of the rotation of the crank. The remaining rotation of the crank allows the foot to be raised to a predetermined height before returning to the starting position and repeating the cycle. Two of these linkages coupled together at the crank and one-half cycle out of phase with each other will allow the frame of a vehicle to travel parallel to the ground. The Klan linkage provides many of the benefits of more advanced walking vehicles without some of their limitations. It can step over curbs, climb stairs, or travel into areas that are currently not accessible with wheels but do not require microprocessor control or multitudes of actuator mechanisms. It fits into the technological space between these walking devices and axle-driven wheels. The scientific study of legged locomotion began just very a century ago when Leland Stanford, then governor of California, commissioned Edward Muybridge to find out whether or not a trotting horse left the ground with all four feet at the same time. The Stanford had wagered that it never did. After Muybridge proved him wrong with a set of stop motion photographs that appeared in Scientific American in 1878, Muybridge went on to document the walking and running behaviour of over 40 mammals, including humans. His photographic data are still of considerable value and survive as a landmark in locomotion research. The study of machines that walk also had its origin in Muybridge's time. An early walking model appeared in about. It used a linkage to move the body along a straight horizontal path while the feet moved up and down to exchange support during stepping

F= Force required.w

m = Mass of the body.

g = Gravitational acceleration.

μ= Coefficient of friction between the linkages.

T_L= Torque required.

Tm= Mean torque.

Speed=3000 rpm ……(motor)

As we use gear box ,speed of motor reduces to 200 rpm.This increases the torque of motor.

Torque is inversely proportional to speed.

So,

F= mg= 2.2 x 9.81 = 19.62 N

T_L = μF × Lrobot = 0.5 x 19.62 X 200 = 2.943 N-m

Tm = TL X F.S = 2.943 X 2 = 5.886 N-m

We are using 12 volt, 24 Watt Dc motor

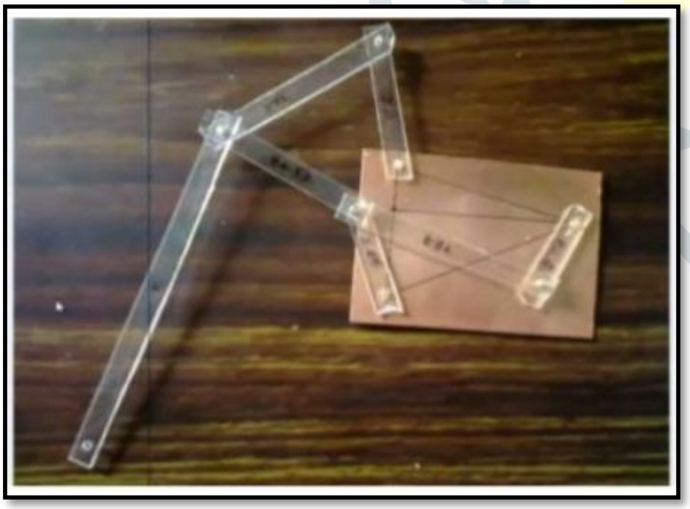
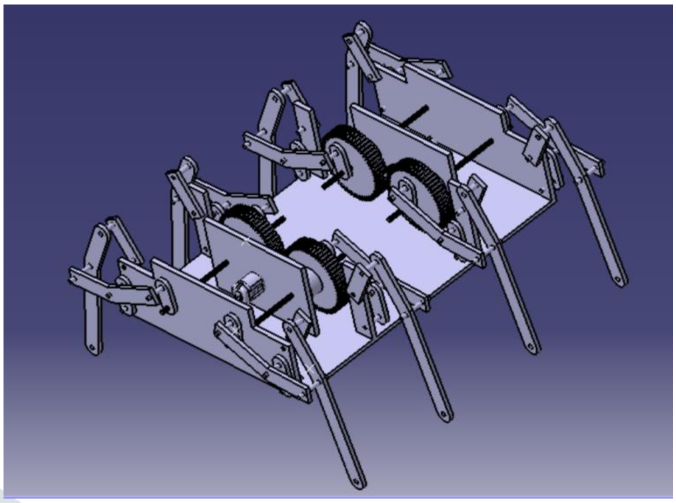


Table -1:

Variables	Values
Robot height, L_{robot}	0.20m
Friction coefficient, μ	0.05
Total mass including load,m	3kg
Safety factor, F.S	2



3. CONCLUSIONS

The purpose of this project is to develop a mobile robot focused on biomechanics of insects.

The main advantage of robots with the Klann system is their ability for wheeled robots to reach places difficult. Through copying into the physical structure of legged animals, the efficiency of mobile robots may be improved.

For the rescue of earthquakes & toxic conditions like the interior of the nuclear reactor, which have tremendous opportunities for genetically driven autonomous legged robots.

Further advantages of walking robots are low power consumption and weight, so it is important to use the minimum number of actions.

We are processing the final design and trying to merge the both the motion. Therefore, we are using Catia software for this operation.

ACKNOWLEDGEMENT

It is difficult for a person to work in dangerous regions or radioactive regions, It is also difficult to move a conventional vehicles through all kind of terrain conditions. To overcome all the dangerous and difficult task all terrain and unmanned robot is to be manufactured which could solve all the problems002E

It is difficult for humans to reach in compact places, or during search and rescue operations in disaster areas where electricity is not available. So there is a need to design a six / eight leg moving support mechanism with low cost and simple mechanism which can carry out the operations which can be easy to operate and effective for carrying out the operations.

The heading should be treated as a 3rd level heading and should not be assigned a number.

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