Controlling and Simulation of Tile Cutting-Machine

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Abstract— Considering examination of existing cutting device and theory sought after cutting the tile and stone, unmistakable association different features of clasp using in cutting instrument to fabricate wear impediment. Controlling of rock cutting machine is crucial system of stone cutting which is one of the sorts of tile cutting strategy, in this we have three sorts of cutting headings i.e., longitudinal, transverse and masterminding the shaper in inclined that is 45 degrees.

In this endeavour we have two parameters I.e., speed and heading of the turn using the Arduino. In this endeavour we viewed the essentially fixed and in this we have one longitudinal bed, transversal bed and one joint which moves the edge of the shaper as per necessity. Present a day we have physically worked stone cutting machines. In this undertaking, we are developing an idea of modernized controlling of the stone cutting machine using Arduino and servo engine. In this endeavour the execution of Arduino and servo engine relationship with the control of the parameters. In this undertaking, view of manual rock cutting machine existing.

The Analysis is done by considering different materials like CNC machine, manual cutters, sharp edges used in typical cutting machines and results differentiated and them.

Keywords —Servo engine, Arduino Uno, Arduino programming in workstation, and demonstrating of the bed of the cutting machine.

I. INTRODUCTION

What is Tile?

Tile is a light-shaded volcanic stone with ores adequately colossal detectable quality with the autonomous eye. Stone is made in a general sense with quartz and feldspar with the minor proportions of the mica, land as well as water competent and different minerals.

A. Employments of Granite

a) Granite is the stone most generally named as an "estimation stone". Estimation stone has asignificance of valuable stone which if there should be an occurrence of the perfect shape.

b) Granite is adequately difficult to restrict the scratch spot, adequately ready to bear colossalburdens, sufficiently lethargic to contradict suffering, and it gives an ideal portrayal clean.

c) It is high in cost, since it is generally utilized for the best finishing and improvements.

d) It is in like manner used as a smasher or all out due to its hardest nature.

B. Favourable Circumstances

➢ Granite is accessibly in huge number of shades.

➢ Granite is amazingly hard in nature and when it is cleaned, it will be scratch safe.

➢ Granite is heat safe diverged from the remainder of the man-made materials.

C. Page Detriments

➢ Hard.

➢ Cold in winter.

➢ Hard underneath.

Cutting means the apportioning or opening of a physical thing, into in any event two areas, using the directed force. Utilization for the most part used for knife and saw, or in medication and science. In any case, any satisfactorily sharped thing can cut of chance that it has a hardness sufficiently bigger than the article being cut, and in case things when applied with satisfactory power. For sure, even the fluids can be used to cut things when applied with sufficient power (For instance water stream shaper). Granite cutting machine and so forth., techniques have for all intents and purposes all physically worked machines and issues looked by them, our task is to control the machine thus with help of Arduino codes and Arduino board, control required, suitable engine.
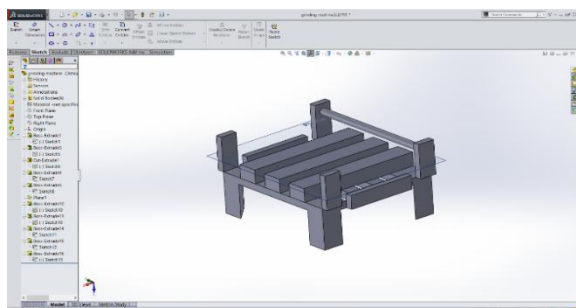

Figure1 Isometric View of Tile Cutting Machine

II. GRANITE CUTTING MACHINE

As we most likely am mindful the one of the significant things in cutting machine is a cutting instrument. In a kind of the cutting machine, the machine is named after the cutting mechanical assembly like single point cutting device, laser cutting machine so on. A cutting tool or cutter is an instrument that is used to oust some material from the work piece by strategies for shear misshape Ning. Cutting may be rehearsed by single-point or different point mechanical assemblies.

Cutting apparatus materials must be harder than the material, which is to be cut, and the device must have the choice to withstand the warmth produced in the metal-cutting procedure. The device must have a specific geometry, with clearance focuses so the front line can contact the work piece without the remainder of the apparatus delaying the work piece surface. The point of the cutting face is likewise furthermore noteworthy, as is the flute width.

Utilization of wrong mechanical assembly can pack the cutting activity on the rock. The decision of the right cutting apparatus is furthermore a noteworthy standard. The cutting device ought to have the correct piece with objective that the apparatus life will be more however mileage should be least.

Structure and Fabrication of the precious stone cutting instruments requires a low compressive quality, wear obstruction and incredible extreme properties. With the goal that its properties while machining due to the scratched zone wear block ought to be low.

III.MODELLING

A. Modelling of Cutting machine

Demonstrating of the stone cutting machine is finished by the thought dependent on at present working example of the physically worked rock cutting machine. This machine has one long bed and two long bars which are utilized to move the course of the engine and long way bar up and down the bed. In this the two bars are utilized to move the shaper longitudinal and transverse way and the slicing apparatus is appended to engine thus it helps for the slanted movement cutting which should be possible in z heading moreover. more than 3 levels of headings should be used.

B. Procedure

    a) Firstly, select and draw rectangle.
    b) Extrude the rectangle bed.
    c) After extruding draw the support beds at each of the ends.
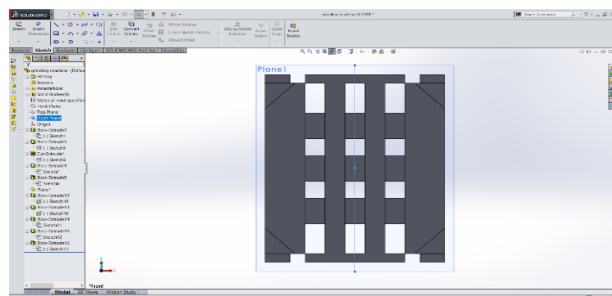   d) Cut-extrude the beds at equal radios at 3 ends.

Figure 2:Top View of Tiles Cutting Machine

Figure 3: Arrangement of Tile cutting Machine proposed Model

Figure:4 Complete Arrangement of Machine Model

e)   Add supports on bed from down view which for the resist the weight of the granite on the bed.
f)   Now adda longitudinal circular bar which acts like a base support to the motor for the motion of longitudinal and inclined at 45 degrees.
g)   The transverse, longitudinal bar and inclined angle are the direction of rotations.

IV. STUDY

Considering the examination of available composition for cutting What is more, it is also discovered that the age cost of the marble and the rock might be expanded utilizing unmistakable production of the device material and the clasp.

1.Parameters of the cutting machine:
         Speed

2.Direction of revolution

 ■   Longitudinal heading.

 ■   Transverse heading.

 ■   Inclination of point at 45 degrees.

The above parameters can be constrained by two techniques i.e.., by man hand control and programmed machine control. Presently, days for the most part the physically controlled machines are accessible in light of the fact that they are effectively worked and less in the cost when they are contrasted with the robotized cutting machines.

The Granite cutting machines experiences two sorts of the tasks, they are cutting and cleaning. For the most part they are utilized in the developments and the ground surface applications in the houses. As they are hard in nature, they required a hardest material contrasted with its hardness to cut it and clean its surfaces. It requires

hard cutting instrument which has the scratch safe and wear safe. Ordinarily these stones have more thickness with the goal that the sections are accessible in hard and more thickness which are not effectively be broken.

In this endeavour, developing the normally controlled rock cutting machine. For this controlling is done by using Arduino and servo engine. We picked this since utilizing Arduino and servo engine speed and course of turn can be controlled adequately and less in cost exactly as expected. By and by we ought to talk expressly about the Arduino and servo engine.

V. COMPONENTS UTILIZED

a) G I pipe.
b) 606-2RS Bearings.
c) Bolts, screws, and washers.
d) Spencer.
e) DC Motor and its Drivers.
f) Servo Motor.
g) Stepper Motor.
h) Arduino Board and Arduino Software.
i) Jumper Wires.
j) Plate, Rack and clamps.
k) Belt.
l) Rack and Pinion path.

The present model is arranged with a two GI pipes intersection to each other and two slides are constructed with the assembly arrangement of 606-2rs bearings, washers, bolt and spacers. In this arrangement the slides are moved along pipe as the path. Stepper motor arranged with belt drive and two pulleys are constructed for the motion of the slide 1 and slide to be moved with help of the rack that is arranged on the path and servo motor. The cutter will be arranged to one end of the slide 2 so the working space of the machine is on the right side of the machine. To the present model, slides are mounted, and the basic model is developed.

Codes:

Arduino code for both the servo motor and stepper motor is generated in the single code, which is operate using the input keys that are provided in the code. The keys that are provided are used to operate the steeper motor and servo motor movements.

```
/*
 * Bluetooh Basic: LED ON OFF - Avishkar
 * Coder - Mayoogh Girish
 * Website - http://bit.do/Avishkar
 * Download the App :
 * This program lets you to control a LED on pin 13 of arduino using a bluetooth module
 */
#include <Servo.h>
Servo myservo;
static const int servoPin = 13;
int in1 = 4;
int in2 = 5;
int in3 = 6;
int in4 = 7;
int R = 11;
int G = 12;

char Incoming_value = 0;              //Variable for storing Incoming_value
void setup()
{
  Serial.begin(9600);        //Sets the data rate in bits per second (baud) for serial data transmission
  pinMode(in1, OUTPUT);
  pinMode(in2, OUTPUT);
  pinMode(in3, OUTPUT);
  pinMode(in4, OUTPUT);
  digitalWrite(in1, LOW);
  digitalWrite(in2, LOW);
  digitalWrite(in3, LOW);
  digitalWrite(in4, LOW);
  digitalWrite(R, HIGH);
  digitalWrite(G, LOW);
```

In the above, the inputs int to provide the position to stop at some rate, respectively.

```
  } else if(Incoming_value == 'l') {
    myservo.write(90);
    digitalWrite(in1, LOW);
    digitalWrite(in2, HIGH);
    digitalWrite(in3, HIGH);
    digitalWrite(in4, LOW);
    digitalWrite(R, LOW);
    digitalWrite(G, HIGH);

  } else if(Incoming_value == 'l') {
    myservo.write(90);
    digitalWrite(in1, LOW);
    digitalWrite(in2, HIGH);
    digitalWrite(in3, LOW);
    digitalWrite(in4, LOW);
    digitalWrite(R, LOW);
    digitalWrite(G, HIGH);

  } else if(Incoming_value == 'r') {
    myservo.write(90);
    digitalWrite(in1, LOW);
    digitalWrite(in2, LOW);
    digitalWrite(in3, HIGH);
    digitalWrite(in4, LOW);
    digitalWrite(R, LOW);
    digitalWrite(G, HIGH);

  } else if(Incoming_value == 's') {
    myservo.write(90);
    digitalWrite(in1, LOW);

digitalWrite(in4, LOW);
digitalWrite(R, HIGH);
digitalWrite(G, LOW);
myservo.attach(servoPin);
myservo.write(90);
}
void loop()
{
 if(Serial.available() > 0)
 {
  Incoming_value = Serial.read();      //Read the incoming data and store it into variable Incoming_value
  Serial.print(Incoming_value);        //Print Value of Incoming_value in Serial monitor
  Serial.print("\n");         //New line
  if(Incoming_value == '0') {
    myservo.write(90);
    digitalWrite(in1, HIGH);
    digitalWrite(in2, LOW);
    digitalWrite(in3, LOW);
    digitalWrite(in4, HIGH);
    digitalWrite(R, LOW);
    digitalWrite(G, HIGH);

  } else if(Incoming_value == '1') {
    myservo.write(90);
    digitalWrite(in1, LOW);
    digitalWrite(in2, HIGH);
    digitalWrite(in3, HIGH);
    digitalWrite(in4, LOW);
    digitalWrite(R, LOW);
    digitalWrite(G, HIGH);
```

```
      } else if(Incoming_value == 's') {
        myservo.write(90);
        digitalWrite(in1, LOW);
        digitalWrite(in2, LOW);
        digitalWrite(in3, LOW);
        digitalWrite(in4, LOW);
        digitalWrite(R, HIGH);
        digitalWrite(G, LOW);

      } else if(Incoming_value == 'u') {
        myservo.write(0);
        digitalWrite(in1, LOW);
        digitalWrite(in2, LOW);
        digitalWrite(in3, LOW);
        digitalWrite(in4, LOW);
        digitalWrite(R, HIGH);
        digitalWrite(G, LOW);

      } else if(Incoming_value == 'd') {
        myservo.write(100);
        digitalWrite(in1, LOW);
        digitalWrite(in2, LOW);
        digitalWrite(in3, LOW);
        digitalWrite(in4, LOW);
        digitalWrite(R, HIGH);
        digitalWrite(G, LOW);

      }
   }
}
```

As the code is generated the keys 'l' and 'r' are used to operate the stepper motor that is belt drive and similarly the keys 's' and 'u' are used to operate the servo motor movement that is rack and pinion. And the key 'd' is used to stop the movement of the slide both belt drive and rack and pinion.

VI. CONCLUSIONS

The work presented in this project is Controlling Granite Cutting Machine having two parameters speed and direction of the rotation. Not only the speed and direction it also represents that in manually operated cutting machines the direction can be controlled but not the speed whereas in the automatic cutting machine not only the direction, the speed is also controlled. To rectify this problem this project helps with an automatically controlled granite cutting machine.

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