

# Smart Weight Detector and Controller for Old Bridges using PLC

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**Abstract** - Here we are thinking about the two focuses for wellbeing reason, assume weight or the positive quality in the vehicles is immense (for example 1kg) which is hurtful for connect then, at that point (Toll Gate/Gate which is built at the beginning of scaffolds on both side) will be at shut position. Assume weight or the positive quality in the vehicles is normal or less than ideal which appropriate for the extensions will be permitted to ignore the scaffold. In this day and age of innovation and because of speed running enterprises, the creation rate has expanded enormously. For the most part, fabricating enterprises continue to produce models with little variety in stature, weight, shape. Also, here weight assumes a significant part. Along these lines it become important to foster Low-Cost Automation (LCA) for less weight items in exact way. Modern mechanization fundamentally centers around creating computerizations having minimal expense, low support, long toughness and to make frameworks easy to use as could be expected. At long last, here we have fostered a LCA framework for arranging the lightweight vehicle based on weight variety utilizing weight sensor which is constrained by Programmable Logic Controller (PLC) and the estimating unit in the framework passes the item before sensors and along these lines arranging rationale is chosen.

**Index Terms** - PLC, Weight Sensor, Gate, Float Sensor, Battery.

## I. INTRODUCTION

In our task, the primary point is wellbeing of extension and sustainable power age. Wellbeing is given to connect by utilizing the weight sensor. At the point when the vehicle disregards the weight sensor, weight of vehicle is detected assuming the weight is above limit, red sign is given. The yield of weight sensor is given to the PLC and which is given to the engine through engine driver LM293D and entryway is shut. At the point when weight of vehicle is beneath limit then, at that point green sign is given and vehicle is

permitted to passes on the scaffold. The controlling of the venture is relying on PLC.

The Improvement of assembling ventures is subject to investigate in assembling cycle and advancement in new items. The nations that have higher assembling rate are known to be created while those with little assembling are considered immature during handling, the crude material gets changed into item. When this item gets prepared it procures an incentive available to be purchased. Thusly, fabricating is 'enhancing' the material. The worth that is procured by the item ought to have more expense permitting the association to bring in cash out of it. By and large, fabricating businesses continue to make same models with little variety in stature, shading, weight, shape and in this way arranging assumes a significant part here. In past times it was feasible to carry out difficult work for arranging comparable items. Be that as it may, these days because of expanded creation and for limiting the work use for such incompetent undertaking, ventures cannot bear the cost of human blunders for arranging these items. This constrained industry to tend towards atomizing the arranging cycle. As economy has consistently been an impressive factor in creating industry, hence it become important to foster Low-Cost Automation for arranging these items in precise way. In computerization industry, constant development, discovering compelling approaches to upgrade efficiency and cut cost out of tasks is the way to progress. Blossoming interest of the robotization frameworks requires key re-assessment in the worth chain and further developing business sector mindfulness. Mechanical computerization basically centers around creating mechanizations having minimal expense, low upkeep, long toughness and to make frameworks easy to use as could be expected. In this venture, we have fostered a Low-Cost Automation System for arranging the lightweight objects based on

tallness variety. The undertaking essentially centers around arranging 3 unique tallness objects utilizing photograph electric sensors and DC equipped engines interfaced with Programmable Logic Controller (PLC). This DC engine utilized for pushing the item from transport to arranged receptacle. Primary transport is fueled by 3 stage AC acceptance engine constrained by Variable Frequency drive interfaced with PLC. Three metal plates are utilized for holding closeness sensors. The first holding plate holds the beginning sensor whose capacity is to begin the transport for predefined time, just if the article is available. This will save the energy by killing the transport engine if the article is absent. The close by mounted second holding plate holds 2 sensors which are masterminded to gauge article's tallness, this second holding plate's finished gathering is known as Height estimating station. This plate has an opening where we can change the stature of sensors according to our prerequisite, this causes the framework to vary from Special reason machine (SPM). Third plate holds the sensor, which flags the VFD to hinder the transport line, so that the diverter can push the article precisely.

## II. METHODOLOGY

From the start, the auto determination switch is chosen with the goal that the whole framework works naturally.

Then, at that point the "Auto beginning press button" (flip switch is utilized here) is chosen and the engine turns over and the transport line begins moving. The DC engine utilized is a DC equipped sort engine whose shaft is coupled straightforwardly with the shaft of the roller. This engine has an info voltage of 12v with an information current of 600mA to 14A. The justification choosing this engine is to accomplish a high beginning force at a steady speed. It has a force of 70kgcm. The engine accompanies a metal gearbox and focused shaft. Shaft is stacked with bearing for wear opposition. The justification picking a high force is having such weighty rollers utilized on the either side of the equipment which is mounted with a transport line.

Then, at that point a few jugs is put simultaneously on the transport line. Presently as the jug approaches towards the photoelectric sensor, the sensor detects the jug and the transport quits running.

As the transport stops the solenoid valve gets stimulated and the water begins filling in the container. After a given time span is finished, then, at that point the solenoid valve gets de invigorated totally and water coursing through the valve is halted and the transport line begins moving. The valve stays de stimulated until the container is detected by the sensor once more.

Then, at that point as this interaction is proceeded with the water level in the tank continues diminishing with course of time. A water drift switch is utilized which is plunged into the tank loaded up with water. The whole length of the hardware is 2m. It has an info voltage of 250V A.C with an information current of 15A. It has a square z shape. It is intended to withstand a temperature of 80degree Celsius. It has both NO and NC contacts and a cfls 2m link length.

It is plunged into the tank loaded up with water so it glides over the water and on decline in water level the buoy switch tumbles down totally towards the ground because of low degree of water which then, at that point shuts the circuit association with the transfer. Subsequently, the siphon that is interfaced with the whole framework then, at that point gets totally empowered and the water from the supply is siphoned straightforwardly to the water tank and it is loaded up with water and step by step the water level beginnings rising and the buoy switch progressively begins to skim over water. After the water is topped off to a specific level and the buoy switch begins coasting once again water, then, at that point the circuit breaks and the siphon gets de empowered all the while.

As this interaction happens the whole framework is killed naturally. It stays in the OFF mode till the tank is topped off with water up to a specific level where the buoy change goes to a totally even position. After the tank is totally loaded up with water the movement of the engine just as the belt is continued separately.

Then, at that point the framework begins filling in as referenced previously.

Crisis SWITCH has likewise been presented in the framework which works like an electrical switch which detaches the whole PLC framework at whatever point any ominous conditions emerge.

The electrical association of the framework interfacing the equipment with the PLC machine has been finished.

An Ethernet link has been utilized to interface the PC with the PLC machine. A stepping stool rationale

(LAD) has been executed utilizing the SIEMENS programming all together for the better comprehension of the framework, with the goal that when the machine is online, we can keep record of what piece of the machine is online according to as necessity

### III. DESIGN & DEVELOPMENT

As shown in figure, Block diagram of Weight Detector and Controller for Old Bridges using PLC

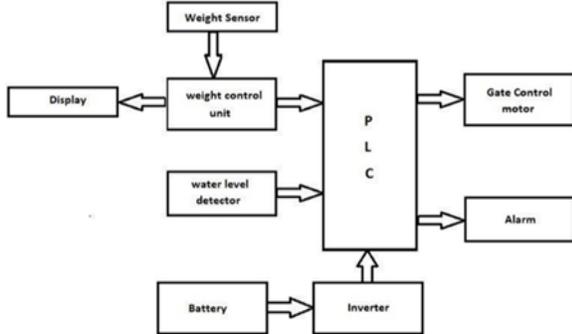


Fig. 1. Block Diagram

### IV. WORKING

Here we are considering the few points for our capstone project. First the sensor will sense the weight of the vehicle or the Load present in the vehicles. Suppose weight in the vehicles is huge (e.g. 1kg) which is harmful for bridge then Toll Gate which is constructed at the starting of bridge and ending of the bridge will be at closed position. Suppose weight of the vehicles is average or below average which suitable for the bridges then Toll Gate which is constructed at the starting of bridge and ending of the bridge will be at open position and vehicles are allowed to pass over the bridge. The working of the flow meter in our project is to measure the flow of water during the flood and it alert us from the further damages.

### V. CIRCUIT DIAGRAM

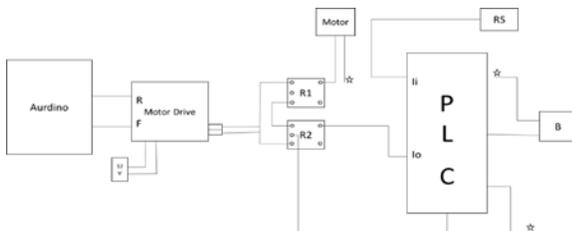


Fig. 2. Circuit Diagram

We are controlling the weight of vehicles by using strain gauge weight sensor for the old bridges and etc. Toll Gate is constructed at the starting of bridges on both side for measuring the load inside the vehicle.

### VI. RESULT

The toll gate will only allow vehicle to pass only when the load in the vehicle is in small amount. The vehicle which is above the amount will pass by another service road nearby. Here are some pics about our capstone project. For Old Bridges (More than 75yrs). For Old Road near Ghats Sections. For Mountains Roads. To measure the accurate weight of object or job in industrial applications and reject inaccurate job automatically. Also, it can be used in packaging industry for packing different food of accurate weight and reject extra weight of food.

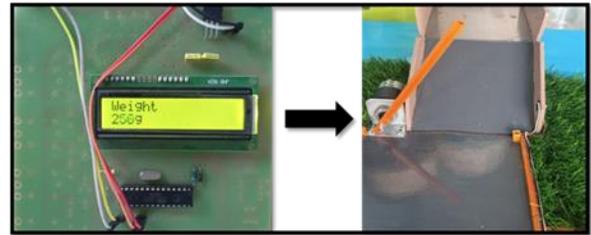


Fig. 3. Vehicle at maximum load.

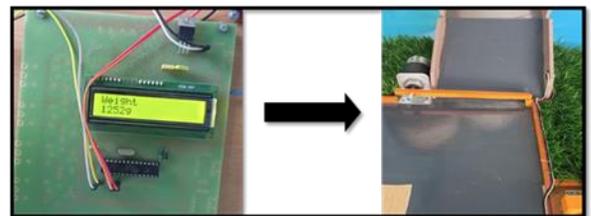


Fig. 4. Vehicle at minimum load.

### VII. CONCLUSION

In industry the production speed should be high because the demand of the product is more. But when we check weight of the object manually then it will take more time for checking the weight and overall speed the production will decrease. So by using this auto weighing control system we totally overcome this problem. PLC will handled all the operation regarding the weight of the job. And operate the pneumatic cylinder according to the weight of the job. The pneumatic cylinder will remove the faulty job from the conveyor belt and pass the accurate job successfully. This is the conclusion of our project.

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