Description:

‘Sparkhound’ is the L shaped scanner which scans the required view of the truck to calculate the sacks of cement in already loaded truck. Thus by using graphics & 3D modeling concepts the sacks of cements in loaded truck are measured. First of all the length & height of empty truck’s compartment will be calculated by using appropriate ultrasonic range finders mounted on Sparkhound, which will throw the rays from upper & back side of the truck or if these dimensions are known already then this data is feed to system through ‘Keyboard interface’. Now once the truck is loaded, the truck is scanned using Sparkhound but this time all range finders are made active. As this time cement sacks will reflect the incident waves we will get distances with respect to these sacks’ positions. The rays thrown from upper side of compartment can detect the number of sacks in that particular stack & the rays thrown from back side will determine the number of columns of sacks in particular row. The structure on which ultrasonic sensors are placed is ‘L’ shaped and contains arrays of ultrasonic range finders which are spaced at regular length interval which is taken in account considering approximate length of cement load. The cements sacs’ count is measured by further calculations based on this collected data and verification is done based on this. Based on these results the data is uploaded on cloud platform so it can be accessed by respective central authority.

The position of scanner while verification process is decided such that all stacks of sacks come across the radiation of ultrasonic sensor (here reference line from which truck compartment’s length and height is measured earlier should be kept fix). The ultimate goal is to scan each and every column along al rows of cement sacks by moving the sparkhound along above mentioned fixed reference line and determine the sacks of cements in each rows & column. In order to get required results the cement sacks should be arranged in particular & unique manner across the truck’s goods compartment. The ultrasonic sensors placed at the upper side of ‘Sparkhound’ will throw the rays downward from ceiling (or from fixed reference height) of truck’s goods’ compartment, which will strike the topmost sacks of cements and will get reflected from those & determine the hollow distance present above sacks which can be subtracted from previously measured total height of truck’s goods compartment and knowing approximate thickness of each cement sack we can ultimately measure the count of cement sacks in each column of particular row. Here in order to avoid interference between reflected sound waves from neighboring mounted range finders sequential excitation of Ultrasonic range finders is used so obtained results are reliable and accurate one. The ‘Ultrasonic sensors’ placed along vertical Section of ‘Sparkhound’ will be just for further verification of measured count i.e. to improve accuracy of device. Microcontroller will apply calculations on gathered data to provide useful data that is Cement sacks’ count along with verification status. The result will be displayed on LCD provided on scanner and also uploaded on cloud platform in order to made it available to everyone having access to web server.

1. Let

H=Total height of truck’s compartment

C=distance from top reference to topmost cement sack in particular column

H-c=Height of column of

h=height of cement sack

(H-c)/h=number of sacks in that column

1. Let

X = Length of truck’s compartment from fix reference

a = distance from outermost cement sacks’ stack (column) in particular row

X-a = total length of Columns of sacks in particular row

b = approximate length of each cement sack

(X-a)/b = Total number of columns in first row.

Here we have particularly used Ultrasonic range finders because they provide great accuracy at quite low cost, thus ultimately reducing overall system’s cost.

Data uploading on web server through WiFi connectivity is the extra feature we are providing in this system, so that all related data will be readily available for one(buyer or seller or even both) having access to this web server.

Here we are using Thingspeak API as it is n open-source Internet of Things app to store and retrieve data over internet and also has integrated support for well known numerical computing software MATLAB from Mathworks.