# Implementation of Embedded System for the Bag Packaging: A Design Approach

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**Abstract**-Bagging controller is the system that used to handle the operation of bagging operation. The system used to control the bagging operations with the different scales of weight and standards. Many factories in world have the bagging and weighting operations. The main purpose of making a project like this one is fixing the faulty weighing of weighing and bagging controller that used in industries.

*Keywords* **– Embedded systems.**

## 1. Introduction

Every human being is affected by weights and measures in some way in a part of our life. In our daily life, weighting measuring are an important and often vital part of our existence. The bodies, food materials, various products we use as an integral part of modern living have all been weighed and measured at some stage in their development.

The first weighing activity began in ancient Egypt. Many changes have taken place since man first developed a system of weights and measures. It developed day after day and from the late 1940s mechanical weighing began to combine with electronics. However, it was not until the device called a load cell was invented. Load cells, or transducers, now lie at the heart of every electronic weight machine. The sensor load cell is used to convert weight into electronic signals for measuring accurate values. Weighing accuracy is very much important issue. The load cell must produce the correct values and allowed standards must be one of the priority issues for a facility. It is apparent that error made in the weighting causes damage to both consumer and the manufacturer.

Weighing equipment does not make the packaging beyond the desired range all the time. When several factors come together as inconstant conditions of the factory and misbehavior of employees, weighing and bagging machine losses its accuracy and begins to fill the bags with excessive or less quantities. This prototype bases on fixing the incorrect weighing of weighing and packing machine because of aforesaid factors. It will work as a kind of quality control unit for weighing. Nowadays weighing systems perform accurately by choosing components suited to the application and by taking steps to control environmental and other forces acting on the system. The load cell in the system plays the vital role to achieve the weighing accuracy. A controller is a significant factor that affects the quality and the system's performance.

### 1.1 Weighing and Bagging Machine

The bagging, storage and loading of material has traditionally been a considerate and time consuming operation. In early days of the production factories mechanical weighing machines are used to weigh the material but approximately sixteen years electronic weighing machines take the place of mechanical ones. Electronic weighing and bagging machines are faster and more accurate compared to mechanical weighing and bagging machines.

Electronic Weighing Machine and it is intended for quick measurement and dumping of consecutive weights. It is suitable for measuring various materials like grains. The system have four major parts has

• Feeder
• Weigh hopper
• Bagging hopper
• Bag clamp

Weighing cycle starts after giving necessary feedings to the system with a command signal that comes from air pressure and material level sensors. The cycle begins with coarse weighing after then fine adjustment starts for accurate weighing. Bagging hopper operates with the command signal from bag clamp which senses the bag. After material flows from bagging hopper, the weight hopper closes and get ready for a new weighing cycle. This operation has been get repeated with respect to each command received signal showing existence of bag at bag clampers. When 50 kilograms of material is weighed and packed, bag is conveyed to a platform scale that is used to weigh the bag statically. Purpose of this operation is to control the bag whether it is filled in correct amount or not. This platform scale works as a verification unit for the accuracy of the weighing and bagging machine.
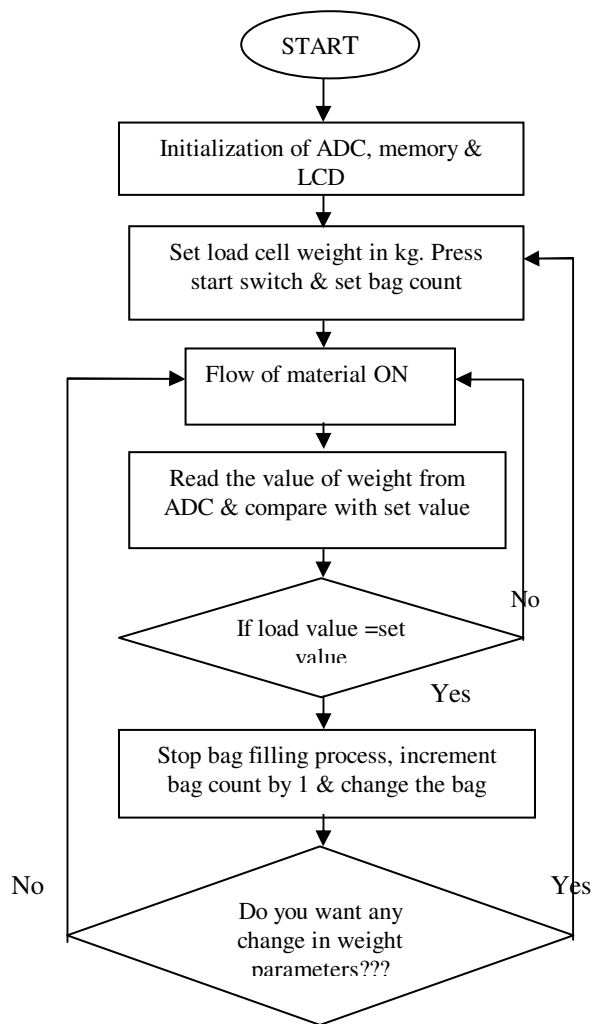
Many factories in world have the bagging and weighting operations. The main purpose of making a project like this one is fixing the faulty weighing of weighing and bagging controller that used in industries. As this system will be microcontroller based the cost of implementation will be much reduced than that of existing PLC based systems. Before starting to design of this system we decided what we exactly like to design system and then appropriate action for this request is intended. The definitively aim of this study could be expressed as *'to achieve as possible as zero error rate by correcting the incorrect weighing according to the standards'*.

The main purpose of this paper discuss is to design of controller for improving the weighing accuracy of the weighing and bagging machine that used in factories.

## 2. Methodology

Bagging controller is developing for improving the weighing accuracy of the weighing and bagging machine. Extraction and filling process is provided by a small bunker that is designed with data obtained from statistical analysis. The vacuum suction is provided for extraction, while a ball valve is used for filling. Moving down and upward of the bunker is ensured with the help of a pneumatic cylinder and finally weighing information is obtained from a load cell. An indicator is used to display the weighing value that comes from load cell. All opening and closing, taking measurements or motion control of these devices has been made with microcontroller interface.

**Flow chart of process**

```
              ( START )
                  |
    Initialization of ADC, memory &
                 LCD
                  |
    Set load cell weight in kg. Press
    start switch & set bag count
                  |
        Flow of material ON
                  |
    Read the value of weight from
    ADC & compare with set value
                  |
         If load value =set        -- No
              value                
                  | Yes
    Stop bag filling process, increment
    bag count by 1 & change the bag
                  |
No    Do you want any change in     Yes
      weight parameters???
```

Weighing speed for weighing and bagging machine is 6 bags per minute. Accordingly, this prototype should complete the operation in 10 seconds. Operation cycle starts with downward motion of the bunker, it is followed by extraction or filling of 1-kilogram bag. At this moment weighing should be completed and finally upward motion accomplishes the cycle. The controller will also count the number of bags filled and indicates weight of particular bag.

This prototype should be usable to the greatest extent possible by every worker, regardless of their ability and duty in the factory. It will also have the freedom to select the speed of operation i.e. slow, medium or fast. The microcontroller will control the all operations like controlling hopper, ball valve and bag clamp, so that every bag will filled with accurate quantity of material.

## 3. System Architecture

To achieve the mentioned above various devices were used in the construction of the prototype. For the filling operation a ball valve is used. It is a very common and simple device for flowing substance feeling operation. Vacuum process was performed by a vacuum generator. These devices are very practical and functional for the generating vacuum in the bag so that the exact pressure can be measured accurately. Pressure transmitter helps us to see the existence of vacuum and it is useful for checking the value of the vacuum to examine whether the vacuum generator is working properly or not. Controlling the direction of the compressed air is another issue for this study and this is figured out by using different kind of the filling process.

Valves such as solenoid valve, directional control valves. The bunker is used to containing a little amount of grain to realizing For the vacuuming operation, the bunker's moving action is provided by the help of Pneumatic cylinder. This Pneumatic cylinder accomplishes the up and down motion of the bunker. Weighing and its display are carried out with two devices. Load cell sends the data of weighing and the indicator helps us to see it on the screen. As it is seen, some of these devices are controlled electrically as some of are controlled pneumatically.
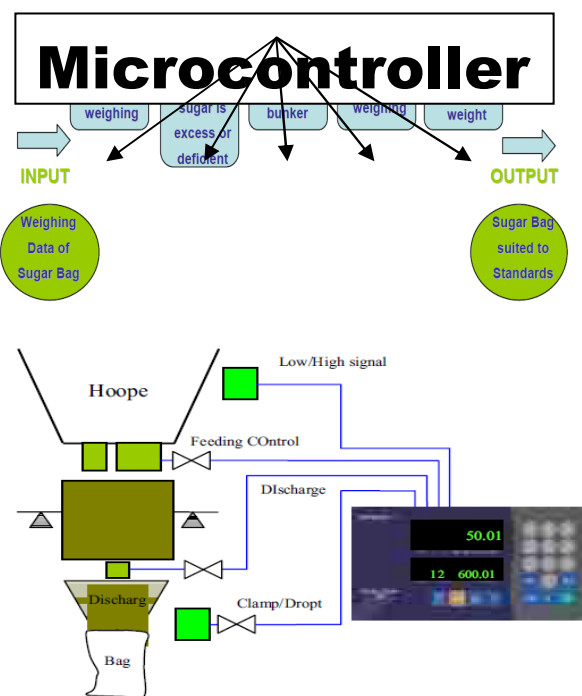
A load cell (also called a load sensor or transducer) is a piece of machined metal that bends with the load's mechanical force and converts the mechanical force into an electrical signal. At the times of the pressure is applied on the load cell, the load cell provide a proportional electrical signal. Briefly, load cell is a transducer which converts force into a measurable electrical output. The output reading of load cell is the weight of bag having the grain or similar substance, which weight display on LCD indicator. It also display the total number of bag packed and total amount of Material packed. The above all process has been controlled by the microcontroller.

## 4. Conclusion

The paper discussed a fully automatic bagging controller system that can be use for the small scale industries because they can't afford the cost Automation implementation.

## References

[1]     A Development of a SCADA control system for a weighing and Bagging machine by Emel Sinem Aykaç.
[2]     Panther plus Bagging controller user manual.
[3]     Design and application of an automatic packaging machine controller based on ATmega 128 by Yuming Lu, and Yingui Liu, Gengyu Li Faculty of Electrical Engineering Tianjin Electronic Info. Vocational Tech. College, Tianjin, China 300132 Guozhi Song, Mingzhe Liu Research & Development Centre Tianjin Fuhang Instrument New- Tech Industry Co. Ltd Tianjin, China 300161 Weixin Liu Tianjin Polytechnic University No.63 Chenglindao Hedong District Tianjin, China 300160  Guozhi Song, Mingzhe Liu Research & Development Centre Tianjin Fuhang Instrument New-Tech Industry Co. Ltd Tianjin, China 300161 Weixin Liu Tianjin Polytechnic University No.63 Chenglindao Hedong District Tianjin, China 300160. [4] A. A. Name, "Conference Paper Title", in Conference Name, Year, Vol. x, pp. xxx-xxx.
[4]     Research on Intelligent Feeding Paper control System Based on Fuzzy Parameter Self-adaptive PID for Fruit-Bag Machine. Zhang Qing, Liu Junfeng, Yang Xin, Liu Hongjie College of Mechanical and Electric Engineering , Agricultural University of Hebei, Hebei, Baiding,071001, China.auhzq@hebau.edu.cn.
[5]     www.bipom.com
[6]      www.top-sensors.com
[7]     www.apollounian.com

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Figure 1: System Architecture

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