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Dimensioning, Weighing and Sorting System (DWS)

USER GUIDE

Final Document

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Contents

1.1 Introduction

This User Guide is a formal architectural blueprint for the DWS product that Armstrong Machine Builders is developing for XYZ Client. The functions which constitute the full calibration of product are discussed in detail within this document. The functionalities of various options are explained in detail in this document.

1.2 Purpose

This document describes all the functionalities of a DWS system. The User Guide is an important reference not only for core team members, but also for other members as a reference guide to understand the functions of this product. With the help of information provided in this document, team members will be able to understand the product more efficiently and use it more effectively.

1.3 Scope

This document is intended to give information of various options present in the DWS application.

1.4 Target Audience

This document is targeted (but not limited) to technical stakeholders:

- Client Team

- Development Team

- IT Management

- Support Staff

It is assumed that the reader has a basic understanding of technical terms.

1.5 Product Introduction

Parcel express companies use Dimensioning, Weighing and Scanning (DWS) systems to identify, weigh and measure the goods they transport.

Package delivery companies have differing volumes of parcels and different levels of automation. Some measure parcels on high-speed conveyors; others process small items that move in totes or on tilt-tray sorters. Some handle palatalized freight, while others handle a bit of everything. Terminals have different requirements regarding bar code reading, conveyor control, integration, and weight and volume measurement. An express company's DWS system is essential to the daily operations of facilities that use them, regardless of the application. Choosing the right solution is crucial-one that can impact both revenue and operational productivity. The aim of this guide is to help you understand various functions available in the DWS system provided by Armstrong.

1.6 What Does a DWS Provide

DWS provides weight, length, width, and height of an object. To determine the dimensional weight, it compares weight and dimensions. Identifying data is captured to create a data profile for each item processed.

Typical Uses of a DWS Automation in the measuring process

- Verification of weights and sizes reported by the customer
- Check the data against the profile in the customer database
- Compliance with the Weights and Measures Regulations

What kind of Items do DWS systems typically handle?
It is possible to identify, weigh and dimension almost any item with the DWS system. Various configurations can be built such as dimensioning and identification, identification and weighing, or with all three data capture elements: dimensioning, weighing, and identification.

1.7 DWS Specification

Details	Units	Values
Max. Product Size	mm	1200*900*900
Min. Product Size Measurable	Mm	150*10*5
Min. Product Size Weighable	Mm	150*10*3
Dimension Resolution	Mm	1
Dimensional Accuracy	Mm	+-10 for both length and width and +-5 for height
Minimum Weight	kg	0.06
Maximum Weight	kg	80
Weight Resolution	Kg	0.01
Weight Accuracy	Kg	+-0.5 or 0.6% of Product Weight (Whichever is higher)
Throughput	Units	1200

Note: The values mentioned in the above table are subject to change as per the project. They are mentioned here as reference only.

1.8 How to Start the TEGMINE DWS Machine

Step – 1: Turn on the main MCB switch. Main switch's position must be as shown in the below image.
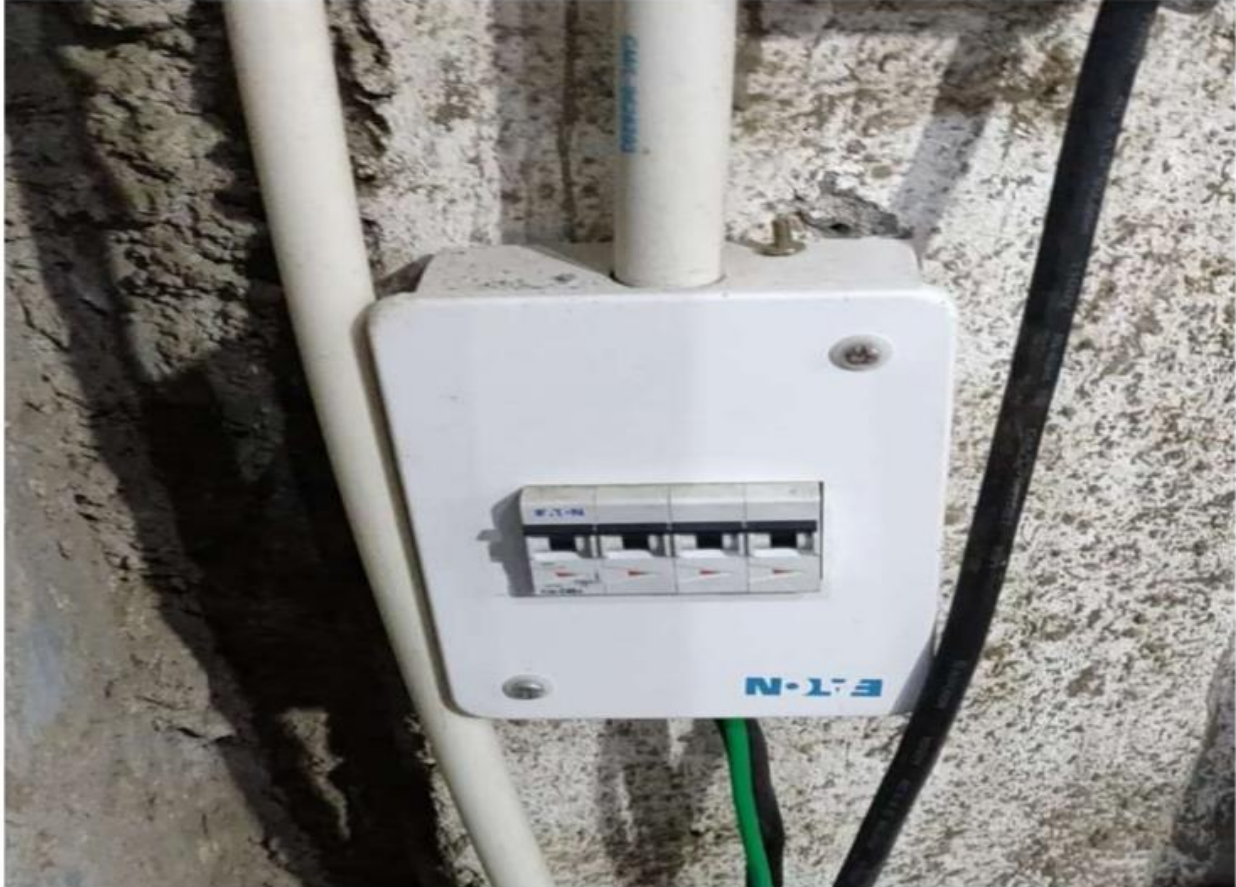
Step – 2: Turn on the selector switch which is present on the white colour telescopic panel. Selector switch's position must be as shown in the below image.

Step – 3: Turn on the selector switch which is present on the Red colour dimensioned panel. Selector switch's position must be as shown in the below image.

Step – 4: Press the START push button of operating panel.

1.9 How to start DWS Software on PC

Step -1: First start the machine and Check if any buzzers are ringing.

Step -2: Start the HMI Screen and check if there are any alarms. If no buzzers are ringing the next step will be to start the three software.

- **Sub Step 1:** Start Armstrong Image Capture which is available on desktop as folder named 'AMBPL_Profiler.'

  After Opening the folder, click on Open Camera. B.

- **Sub Step 2:** Start Armstrong Data Capture which is available on desktop as folder named 'AMBPL_Profiler'.

- **Sub Step 3:** Start Armstrong Data Sender which is available on desktop as folder named 'AMBPL_Profiler'. After that Open Chrome and Click on Bookmark (Delivery | Dashboard)

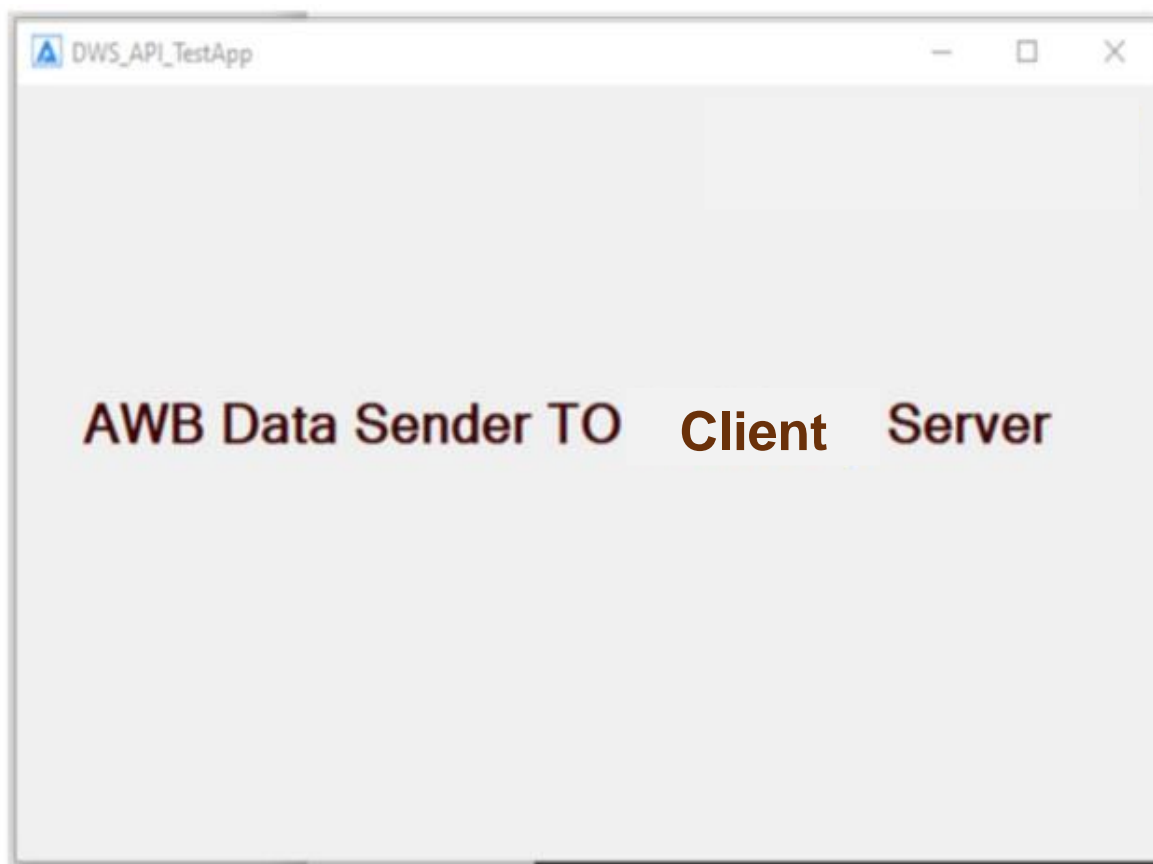> **Note - If the system is restarted at any given point, you must restart all the three software too.**

Once all the three software have started their screens will look as shown in the below images:
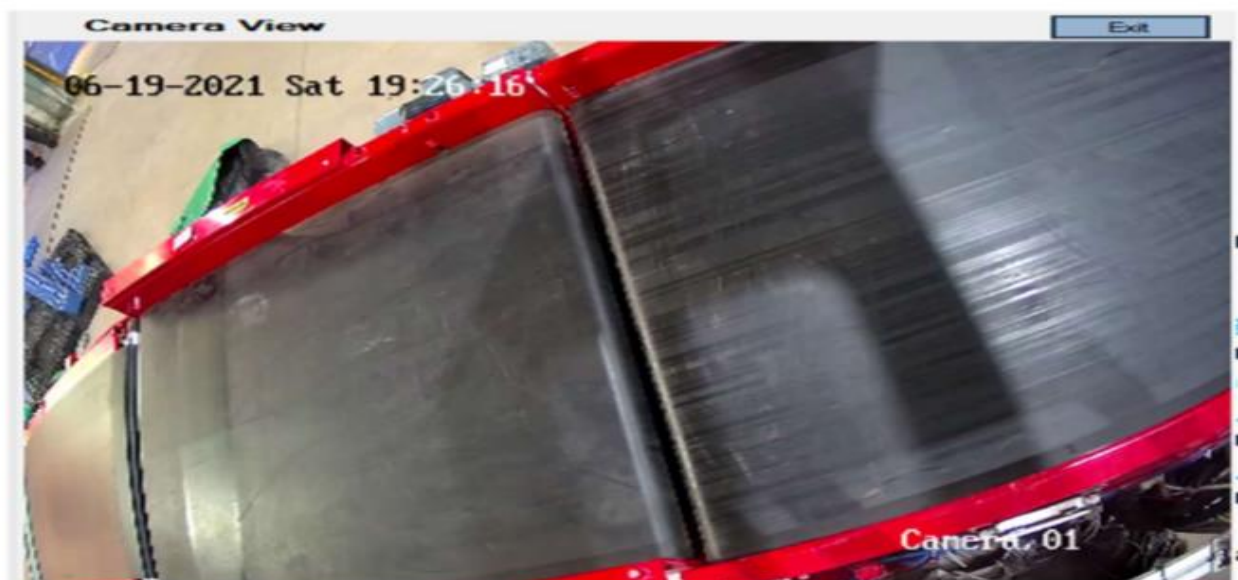
Armstrong Image Capture Application Main Screen on opening

Armstrong Data Capture Application Main Screen on opening

Armstrong Data Sender Application Main Screen on opening

1.10 User Interface Screens (Web application)

To start the web application, click on the bookmarks tab on the internet browser in the system. There will be site which is pre bookmarked by the name 'Armstrong DWS'. The purpose of this module is to provide operators and users with a better view of the data gathered by the system. Several screens are available in the web application to provide various information. Let us see all of it one by one:

1. Login

2. Dashboard

3. Reports

4. User Management

5. Calibration box settings

6. Alarm/Fault Master

Login

Open the application by clicking the link provided by Armstrong.

The Login screen as shown in *Figure 1* will appear once the web page is loaded.

Figure 1

After entering the log in credentials click on LOG IN. Once you have successfully logged in, another landing page will appear as shown in *Figure 2*
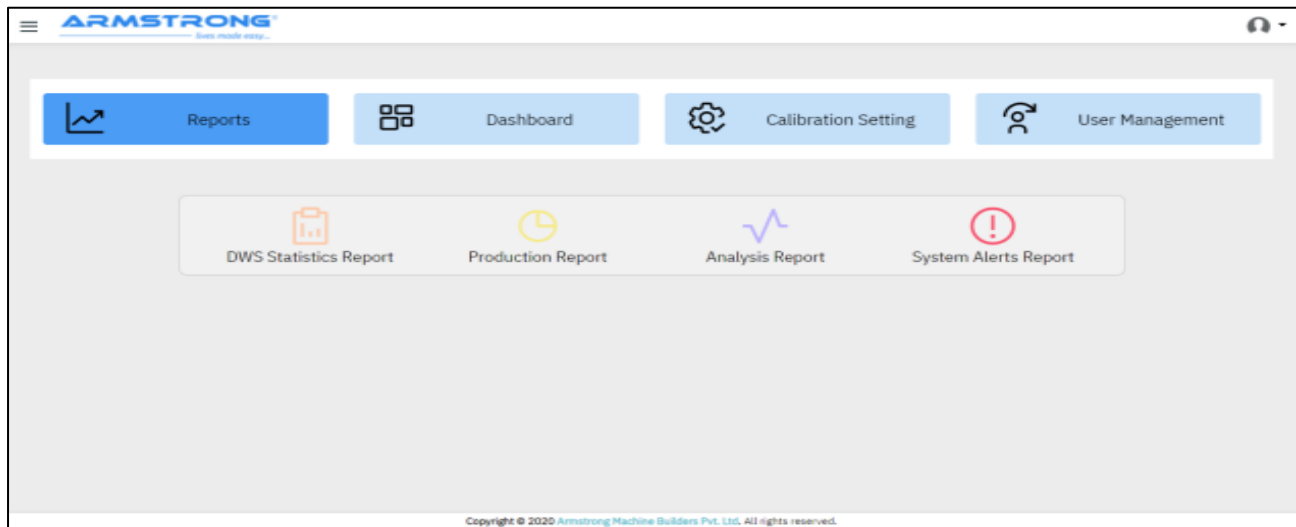

Figure 2

On the landing page, different tabs are available. Users can click on them to access different options. All these tabs are explained in detail below:

Dashboard

Live dashboard is part of the web application. This live dashboard displays the delivery status in real time. This includes bar codes, weights, lengths, widths, and heights, etc of the scanned shipment. Data can be downloaded in an Excel sheet and a date range can be searched using the dashboard's functionality. An example of a dashboard is shown below in *Figure 3*:

Sr.No	AWB	Length(cm)	Width(cm)	Height(cm)	Weight(g)	Volume(cm3)	Real Volume(cm3)	Package Type	Data Sent	Failed Reason	Timestamp
1	1337829942293	24.1	21	11.5	4200	5820	5703	Box	Success		Oct 11 2021 7:24PM
2	6297411796340	39.8	30.2	19.9	4480	23919	23433	Box	Failed	6297411796...	Oct 11 2021 2:57PM
3	6297411796270	39.9	30.3	19.9	4470	24059	23578	Box	Failed	6297411796...	Oct 11 2021 2:54PM
4	6297411796465	39.9	30.4	19.9	4470	24138	23692	Box	Failed	6297411796...	Oct 11 2021 2:54PM
5	6297411796340	39.9	30.3	19.9	4470	24059	23572	Box	Failed	6297411796...	Oct 11 2021 2:53PM
6	6297411796550	39.8	30.3	19.9	4490	23998	23574	Box	Failed	6297411796...	Oct 11 2021 2:53PM
7	6297411796340	39.9	30.4	19.9	4450	24138	23706	Box	Failed	6297411796...	Oct 11 2021 2:53PM
8	6297411796270	39.8	30.3	19.9	4450	23998	23515	Box	Failed	6297411796...	Oct 11 2021 2:52PM
9	6297411796410	40	30.3	19.9	4430	24119	23758	Box	Failed	6297411796...	Oct 11 2021 2:49PM
10	6297411796465	39.7	30.5	19.9	4440	24096	23684	Box	Failed	6297411796...	Oct 11 2021 2:06PM

Figure 3

Understanding the Dashboard

Kindly Refer *Figure 4 and 5* to understand the complete Dashboard:
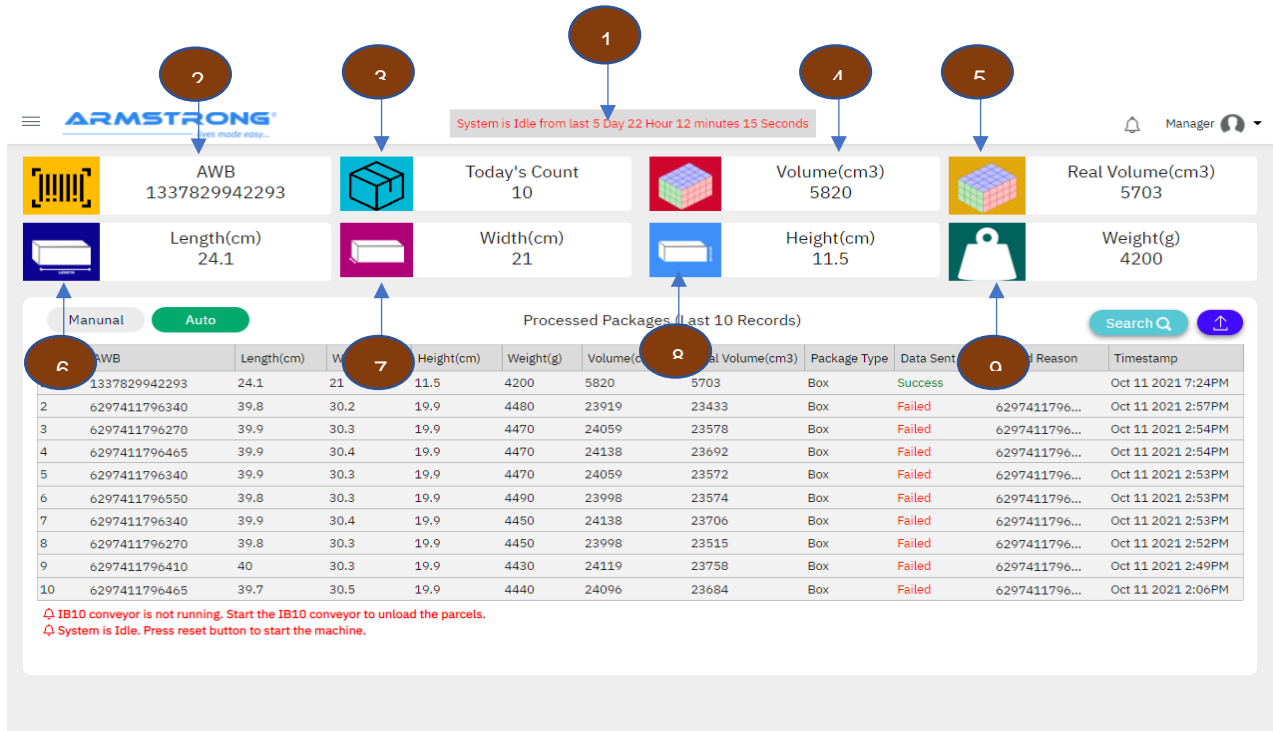

Figure 4

1. **Tab 1 -** Displays the total idle time of the system. It will always appear in red colour.

2. **Tab 2 –** AWB: Airway Bill Number. This will display the Barcode number of the current shipment being scanned or the latest shipment which was scanned.

3. **Tab 3 -** Today's Count: It gives the information of the total number of shipments that are scanned in a day.

4. **Tab 4 –** Volume. Volume of the scanned shipment will be displayed here in cubic centimetre (cm^3).

5. **Tab 5 -** Real Volume. Real Volume of the scanned shipment will be displayed here. It is the difference between the volume and vacuum of any box.

6. **Tab 6 –** Length. Length of the scanned shipment will be displayed here in cm.

7. **Tab 7 –** Width. Width of the scanned shipment will be displayed here in cm.

8. **Tab 8 –** Height. Height of the scanned shipment will be displayed here in cm

9. **Tab 9 –** Weight. Weight of the scanned shipment will be displayed here in grams (g).
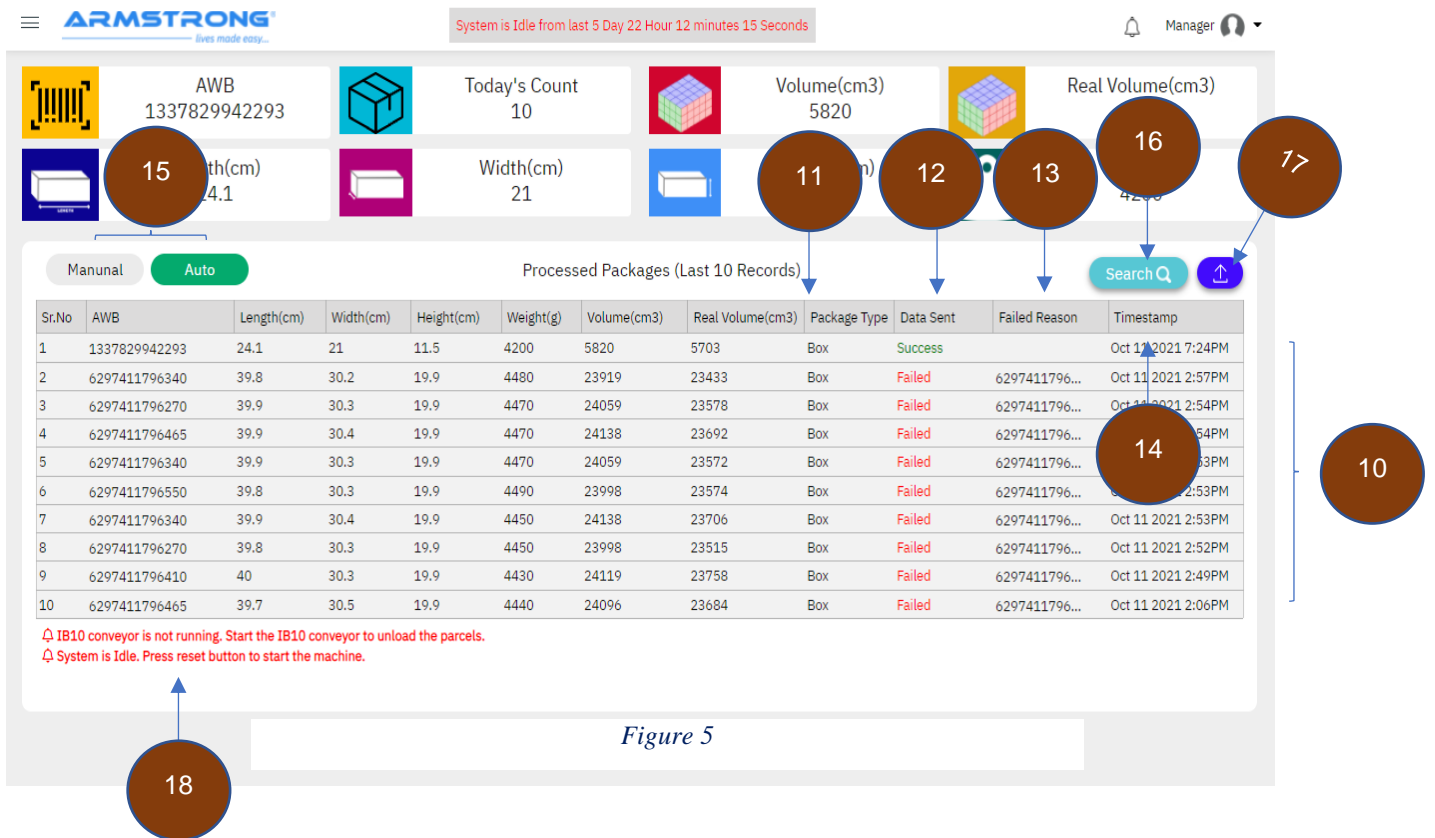
Figure 5

10. **Tab 10 -** The live Dashboard will show details of only 10 most recent scanned boxes. For details about more than 10 boxes one must go and check the reports.

11. **Tab 11 –** Package Type. Provides information about the Packaging type – Box or Non-Box.

12. **Tab 12 –** Data Sent. Informs whether the scanned data is successfully sent to the customer ERP or not by mentioning the data sent status as *success* or *failed*.

13. **Tab 13 –** Failed Reason. At any given point if the system is unsuccessful in sending the data to Customer ERP then the reason for the same will be displayed in the failed reason column using an error code, which can be reviewed by customer.

14. **Tab 14 –** Timestamp. It displays the date and time of the data being captured.

15. **Tab 15 –** Mode. Data Collection can be done in two mode – Manual and Auto. This can be changed by clicking on either mode presented on the Dashboard.

16. **Tab 16 –** Search. This option is used to search data for a specific shipment. One must put relevant Bar Code number here to get the correct data.

17. **Tab 17 –** Export. This tab is used to download the dashboard data in Excel form.

18. **Tab 18** – System Alerts. Any alert related to the system will be displayed here in red colour. When you click on these alerts another window which looks like *Figure 6* will pop up.

Active alarm's   ✕

Sr.No	Time	Date	Error Description
1	19:46	5:10:2021	IB10 conveyor is not running. Start the IB10 conveyor to unload the parcels.
2	19:46	5:10:2021	System is Idle. Press reset button to start the machine.

Close
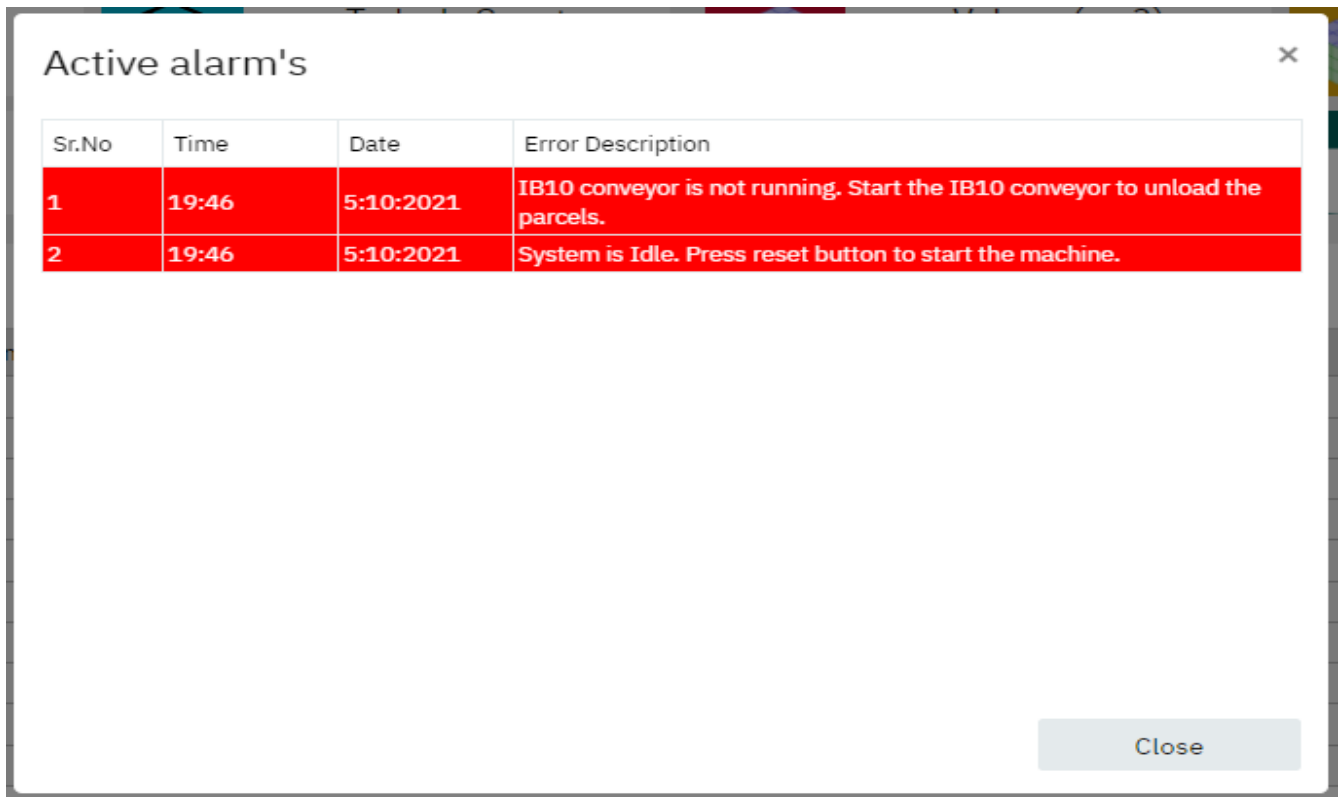
Figure 6

Opening the Menu

To open the full menu, click on the three lines available at the top left corner of the application.

Figure 7

In the Menu if you click on system alerts a window which looks like *Figure 8* will pop up. This window shows all the possible system faults and the ones which are active will be highlighted in red colour.

Figure 8

On clicking the Active alert (Highlighted in red) a pop-up screen comes up. Refer *Figure 9*. This pop up will also give information about how to resolve the alert. Once the issue is resolved the Highlighted red colour will automatically turn to no colour indicating that the issue is resolved successfully.
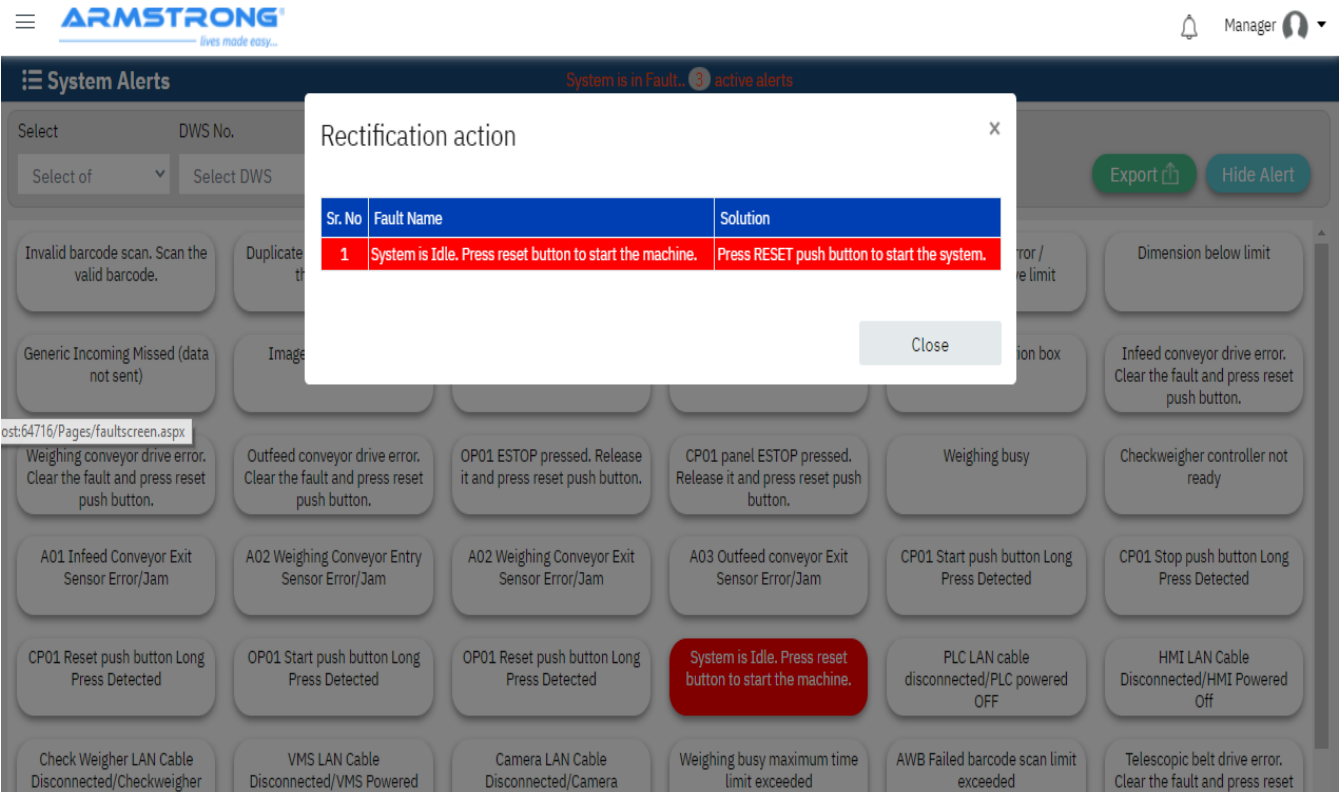
Figure 9

System alerts for a particular date or duration can also be searched using the search option or one can use the DWS number to find all the alerts for that DWS.

Reports for the same can be downloaded using the Export option.

When you click on the Hide Alert button, this screen gets minimized and another screen which tells us number of active alerts can be seen
Refer *Figure 10.*
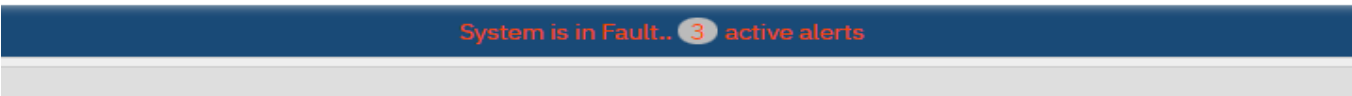
Figure 10

If you click on the number of active alerts a screen which looks like *figure 11* will pop up. This screen tells more information about the active alerts and the total time of the alert.

Figure 11

Reports

This module contains reports for production analysis in both tabular and graphical formats.

An image of a tabular report can be seen below in *Figure 12*:

Figure 12

In the graphical report, the user can view each part of the delivery in different ways, such as by day, by package, by length, by width, by height, by hour, by LBH, by weight. Refer *Figure 13,14,15 and 16.*
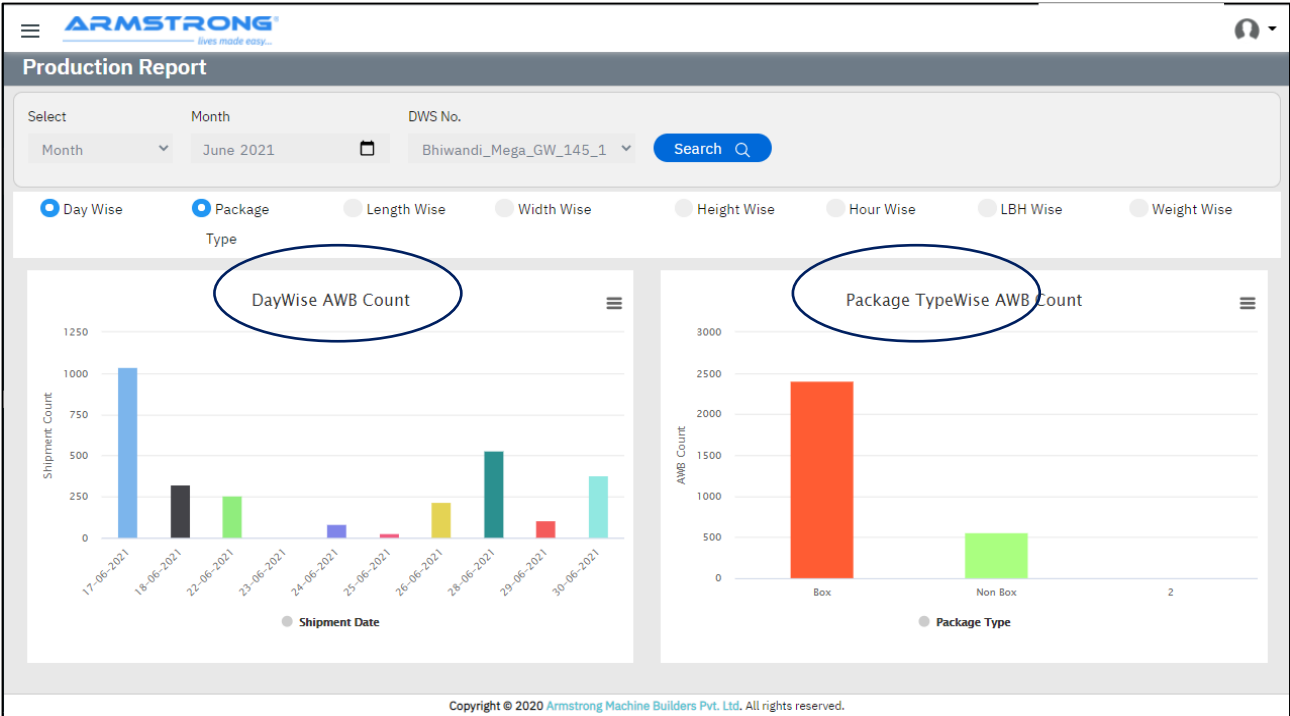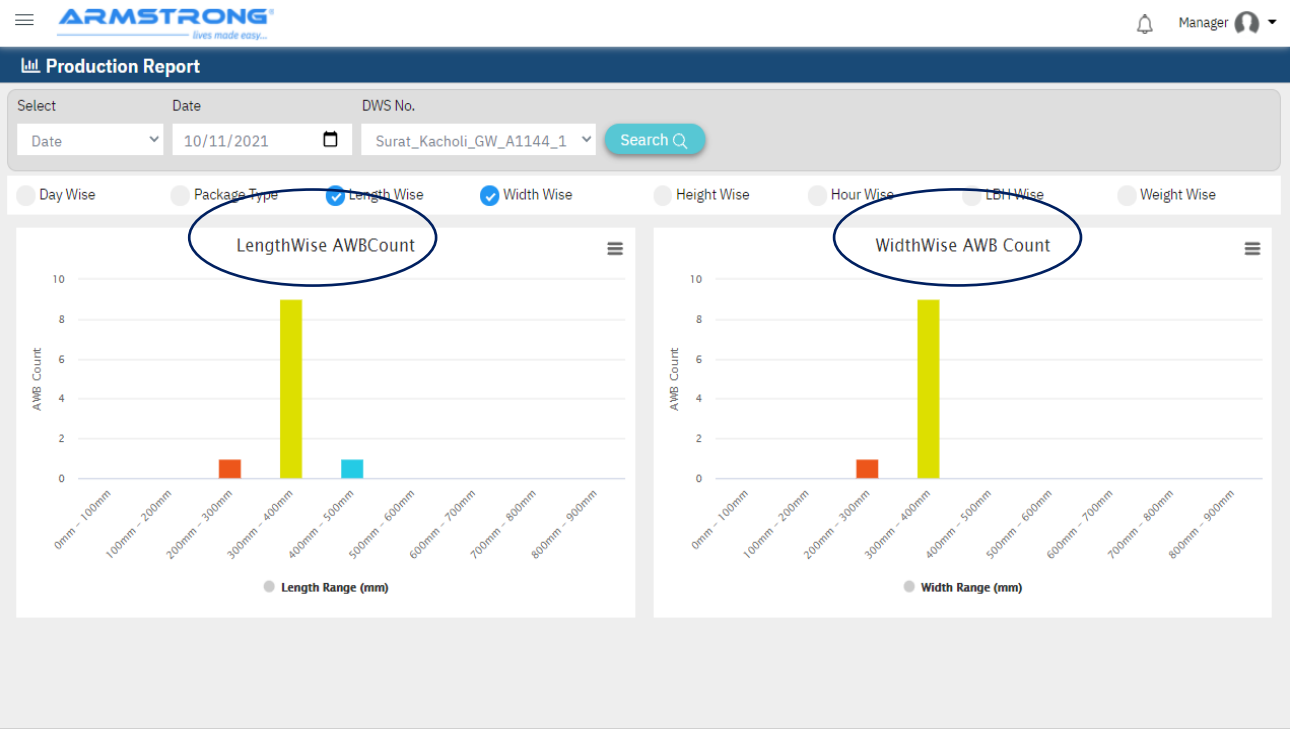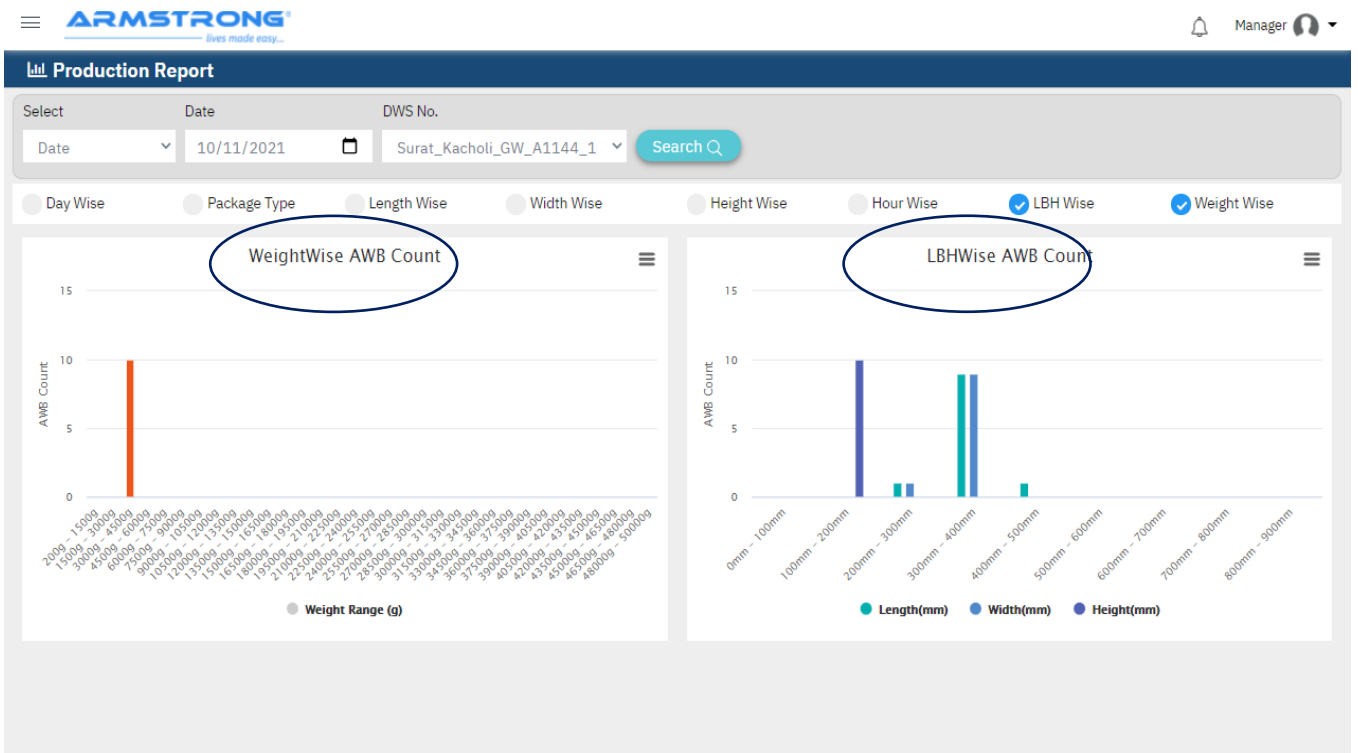

Figure 13

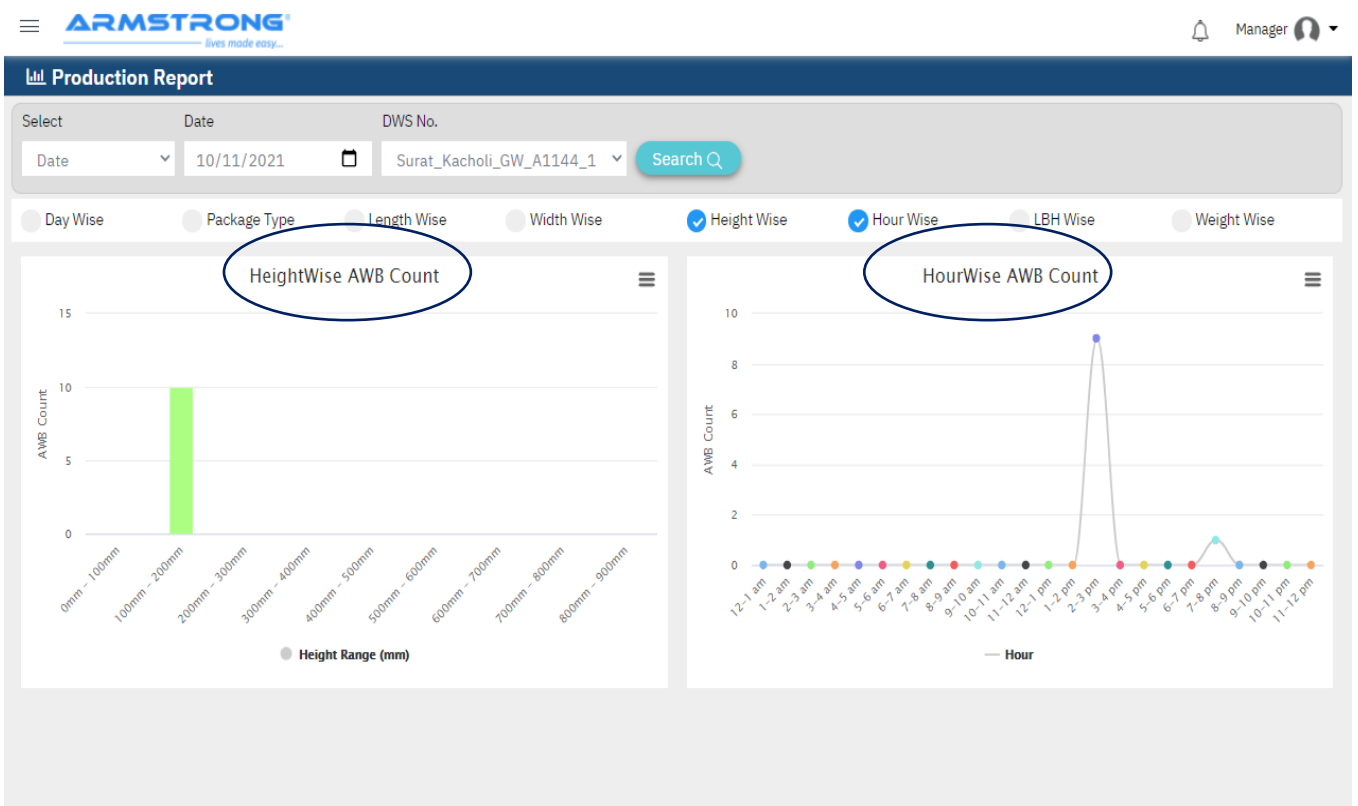*Figure 14*

Figure 15

Figure 16

Reports in tabular format can be downloaded as excel sheets by clicking on the Export button.

Also, one can search reports using different search parameters such as date, date range, month, week by clicking on the search option.

Production Report

Various reports can be viewed and downloaded by clicking on the Production Reports tab in the menu.

1) Production analysis report (system alerts)

This report gives information about the overall time a particular alert was active. It also gives the total time of active alerts of the system. This can be viewed day wise or for any duration by changing the parameter using the search option. Refer *Figure 17.*
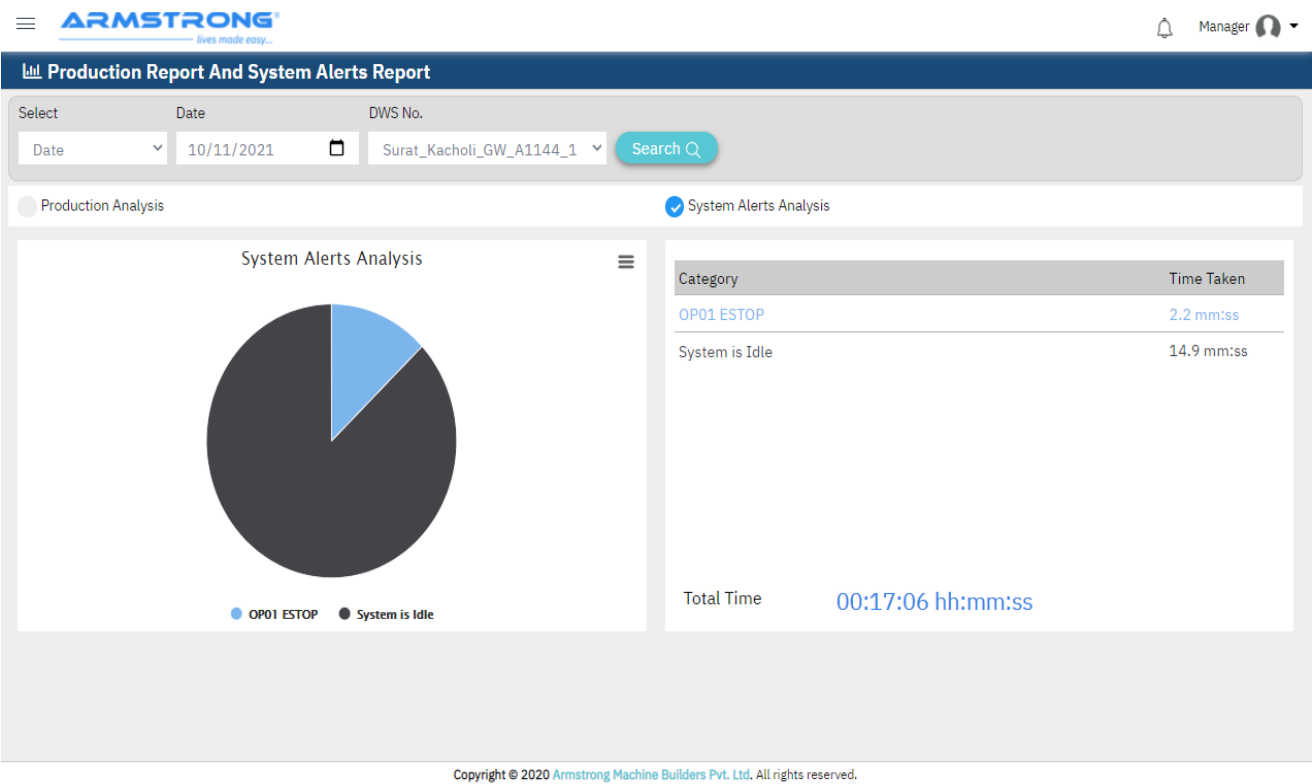

Figure 17

2)   Production analysis report (AWB count)

This report gives the total AWB counts for a particular date or for selected duration. It also shows the information about the number of scanned data which were sent successful, or which failed. Refer *Figure 18.*
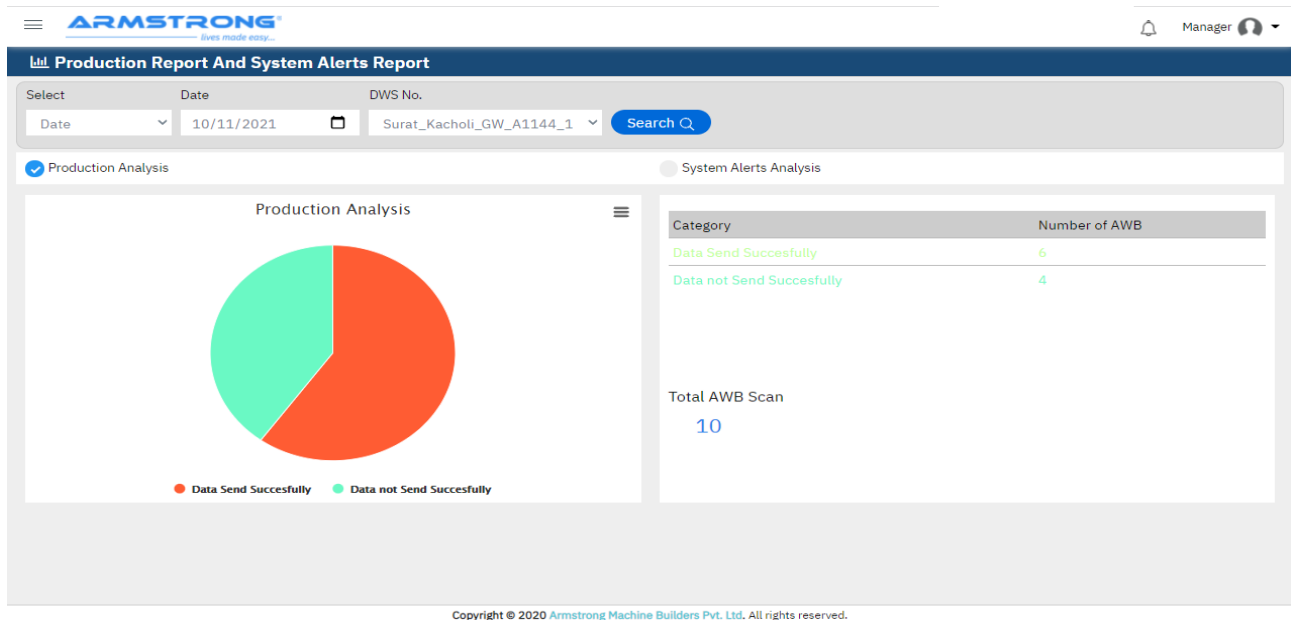
Figure 18

DWS Reports

The DWS reports can be viewed and downloaded by clicking on the DWS Reports option in the menu.

1) DWS Statistics report (All)

This shows the total data of all the scanned shipments for a particular date or duration, whichever is selected. This can be downloaded by clicking on the export button. Refer *Figure 19.*

Sr.No	AWB	Length(cm)	Width(cm)	Height(cm)	Weight(g)	Volume(mm3)	Real Volume(mm3)	Package Type	Data Sent	Failed Reason	TimeStamp
1	1337829942293	24.1	21	11.5	4200	5820	5703	Box	Success		Oct 11 2021 7:24PM
2	6297411796340	39.8	30.2	19.9	4480	23919	23433	Box	Failed	62974117963...	Oct 11 2021 2:57PM
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6	6297411796550	39.8	30.3	19.9	4490	23998	23574	Non Box	Failed	62974117965...	Oct 11 2021 2:53PM
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9	6297411796410	40	30.3	19.9	4430	24119	23758	Box	Failed	62974117964...	Oct 11 2021 2:49PM
10	6297411796465	39.7	30.5	19.9	4440	24096	23684	Box	Failed	62974117964...	Oct 11 2021 2:06PM

Total 10 shipment processed 1 shipment are successfully sent and 9 shipment are failed.   First   Previous   1   Next   Last   Page: 1 / 1
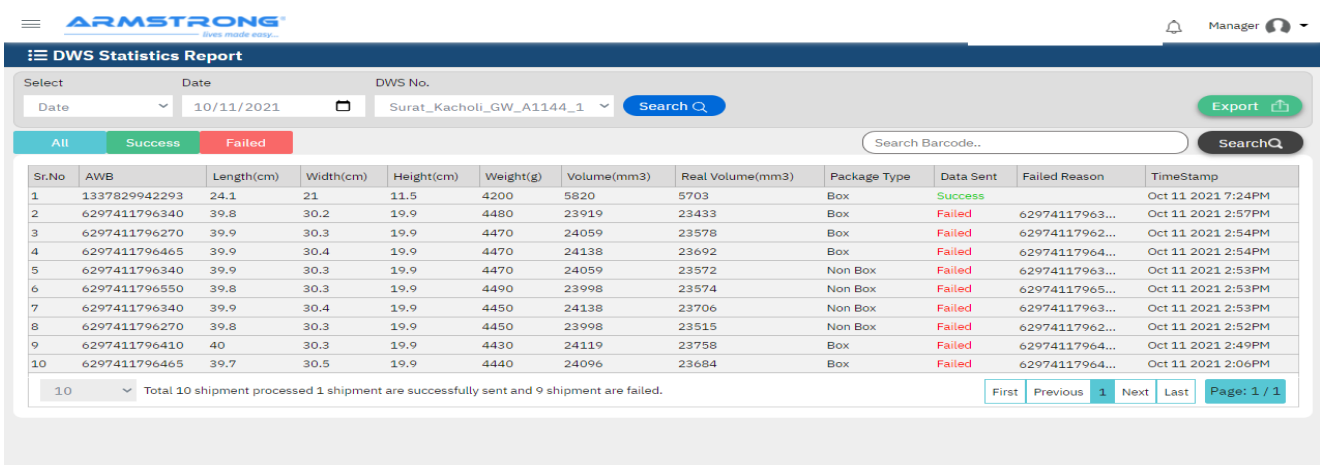
Figure 19

2) DWS Statistics report (Success/failed)

One can view only the data for all successful operations of a particular time by clicking on the tab of success present on the screen. Refer *Figure 20 and 21.*
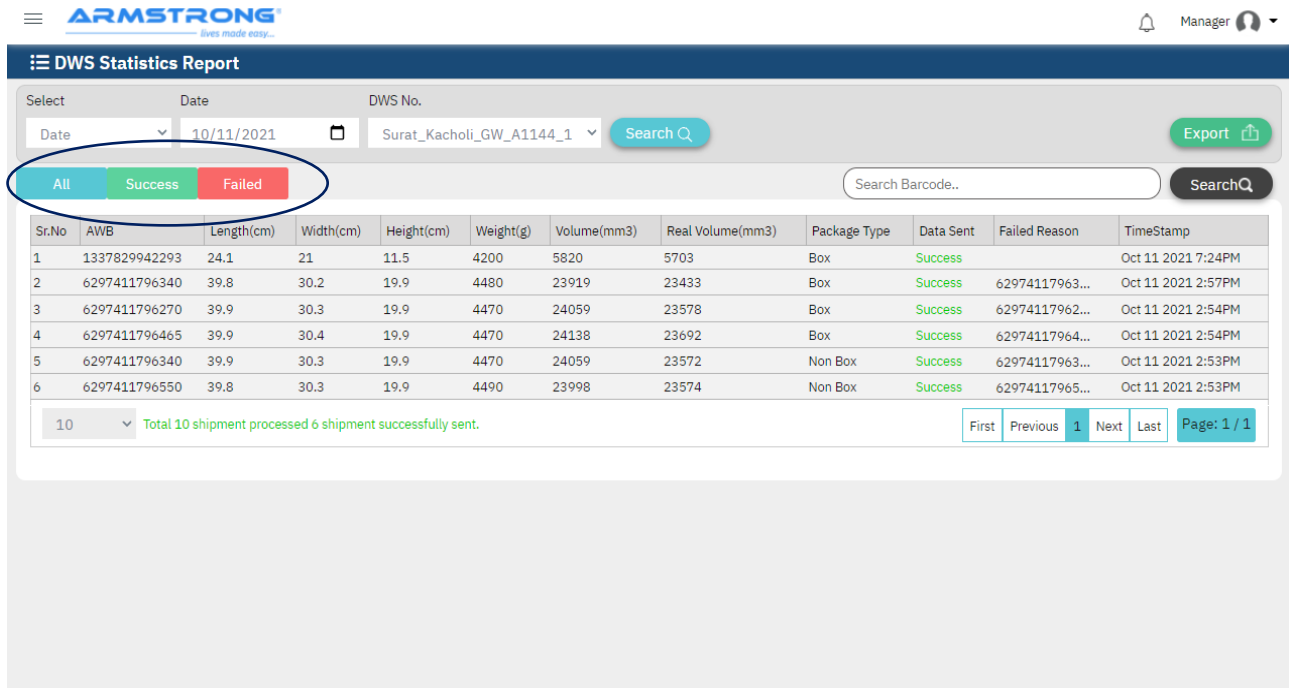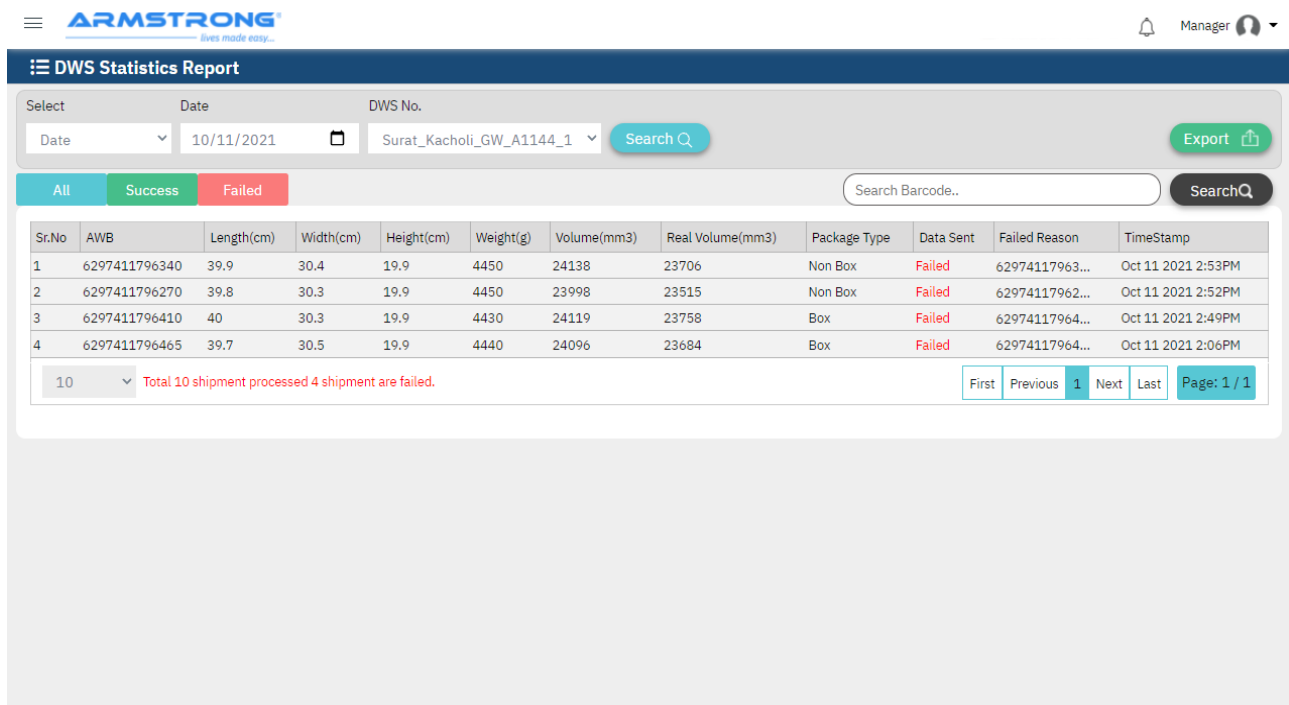

Figure 20

Figure 21

User Management

This tab will only be visible if one logs in using Admin credentials. Using this tab, the operator or any user group can be given different access rights for accessing the system. An individual or group of users can be created. User credentials can be changed. The screen of user management looks the *figure 22.*
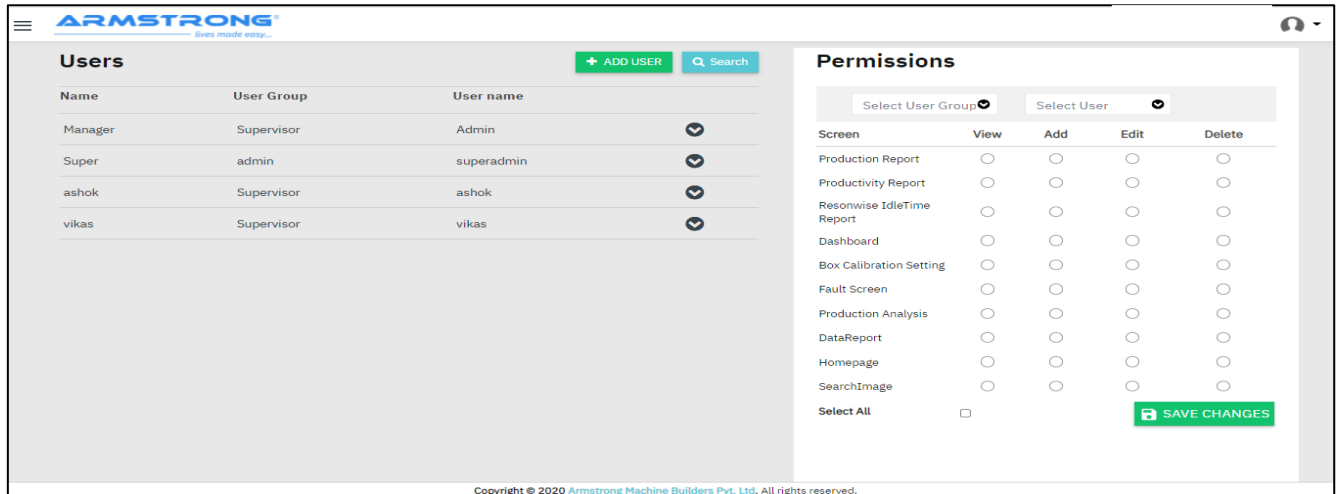
Figure 22

New users or a user group can be added or deleted from here. The right panel shows the permission given or to be given to any user/user group. The Admin can change these settings anytime they want.

Users/User groups can be searched using the search tab.

A new user can be created by clicking on the 'Add User' tab as seen in the *figure 22.* Once the add user tab is clicked, the screen will look like as shown in *Figure 23.*
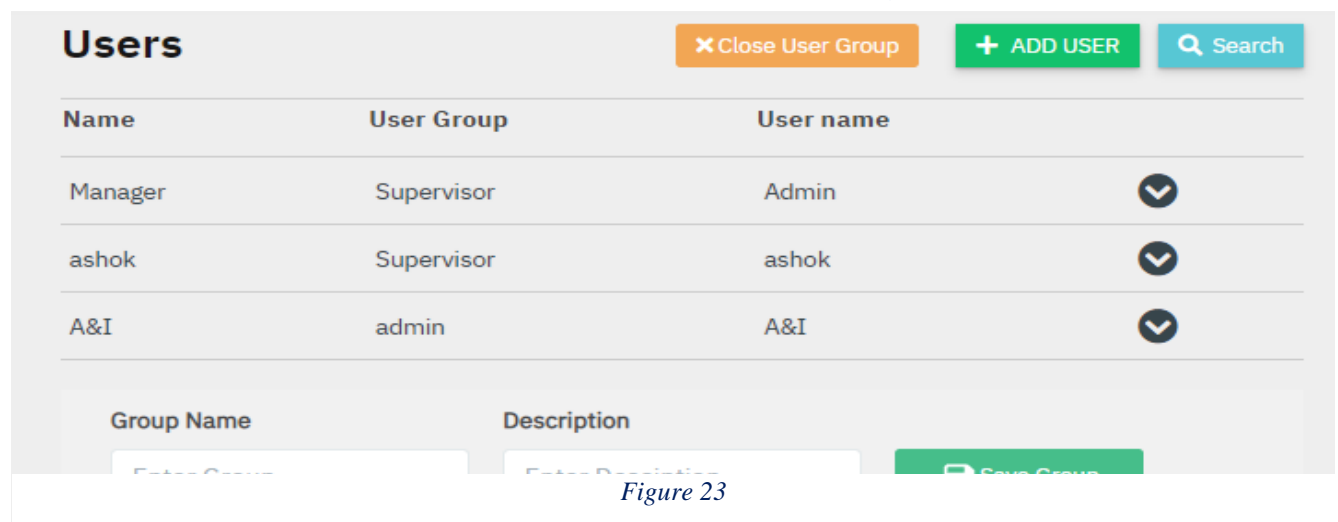
Figure 23

Credentials will be asked again when one tries to add a new user. Refer *Figure 24.*

Figure 24

Once the correct password is fed and changes are saved by clicking on 'Save Changes' tab, the screen will be redirected, and it will look like *Figure 25*. After that one can click on the 'close tab' and come to the main screen – *Figure 22.*

Figure 25

Calibration Setting

Login >> Landing Page >> Reports >> Calibration Setting.

This is one of the important aspects of the DWS system. To ensure that the system is working efficiently and without errors, one must calibre the settings.

One can click on the 'calibration setting' tab available in the menu and make the necessary changes to it.

The main screen of calibration settings looks as shown in *Figure 26.*

Figure 26

Calibration is necessary for quality control. Here we will feed the system with details of at least 5 boxes and keep them as a reference for quality check. After a set duration of set number of boxes being scanned, we will pass one of these calibration boxes. If the data scanned is matched to the pre saved data, then the calibration is successful or else it will show a failed pup up on the screen. The system will halt unless the calibration is successful. Error of +/- 20 is allowed here.

Successful Calibration – Means that the system is functioning correctly without errors.

Failed Calibration – There is some error in the system. One must check all the alerts and resolve the issue and then proceed.

For setting the box count as per the number of boxes, click on Box Count, and an input box will appear.
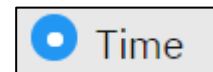
Enter the box count and click Save.

For Setting the calibration as per time, select the Time Checkbox on the Calibration section and input the time in minute format

This can be changed as per the need of the client.

Note: Any setting related to the system for example – change in units shown, scale change in graphs, etc can be only by Armstrong. Once must reach out to the Armstrong team if they require any such changes.

1.11 DWS Process – Image Capturing

The Image Capturing Process in DWS is performed as follows:


```
DATETIME : 13-10-2021 10:15:19 AM
LOCATION : SUP
AWB_NO   : 2793640490
LENGTH(cm)   : 47.20
WIDTH(cm)   : 15.70
HEIGHT(cm)  : 6.00
WEIGHT(Kg)  : 0.85
REAL VOL(cm cubic): 4575.00
```

Step 1 - Shipments are sent by the operator through a conveyor belt to the weighing area.

Step 2 – Weight of the box is captured and then it moves ahead to the canopy area.

Step 3 – The canopy area has a camera fixed to it. When the shipment reaches the mid of the canopy area an image is captured with the help of the camera.

Step 4 – This image is sent to the Main server for drawing purpose.

Step 5 – Parallelly the box moves ahead to the LBH (Length, Breadth and Height) Scanning area. Data of the box is captured in the software.

Step 6 – Once we have all the data captured in the software, we draw the same on the image captured in the main server.

Step 7 – Once the drawing and printing is successfully done it is then sent to the Cloud Server.

Step 8 – If due to some problem the system is not able to send the printed image to the cloud server, it will be sent to another local server, because on the main server data is stored only for 24hrs, after that it gets erased automatically. So, if the captured image is not sent to cloud server, we move to it another local server for safekeeping until it is uploaded to the cloud server.

*Reason for the failure can be checked from the system alerts and resolved. *

> **Note – In case of power loss or internet connection issue, the main server will retry sending the image data to cloud server three times on its own. If the data is still not sent successfully, then a flag '0' will be raised.**
>
> **The system will not start unless the flag issue is resolved.**

1.12 Machine Break down

Scenarios when machine stops functioning-

1. Loss of Internet Connection
2. Data not syncing with WMS
3. Zero Dimension recorded
4. Zero Weight recorded
5. Duplicate Dimensions recorded (continuously for 5 shipments)
6. Duplicate Weight recorded (continuously for 5 shipments)
7. Dimension Outside limits
8. Weight Outside limits
9. Sensor Malfunctioning (Any Sensor on any conveyor of the system)
10. Emergency Button Pressed, etc.
11. Power Saving Stop when profiler not functional for 10 mins

1.13 Table of Figures

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