
Faculty of Engineering
Cairo University


Systems & Biomedical Engineering Department

# Computerized Maintenance Management System

FINAL ASSESSMENT PROJECT

SUBMITTED TO:
DR BASSEL TAWFEK
DR EMAN MARZBAN

**TEAM NUMBER: 5**

**TEAM MEMBERS:**

1. ASMAA MAHMOUD
2. SALMA MOHAMED
3. MOHAMED ELMOATASEM
4. MARWA ABDULLAH
5. MENNA HAMDY

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## Description of Project.

We used web development as a software by making FRONT END by using HTML, CSS and JavaScript, DATABASE by using MYSQL and BACKEND by using NODEJS.

We created about 30 Pages that totally describe how our CMMS works. These pages include forms which are.

1. Add an equipment, employee and department.
2. Calibration or PPM or scrap or report for a certain equipment.
3. Make a daily pass form.
4. Search for equipment form.

These forms require different types of data which is stored in our database system so that they would display the data we inserted in a table. Each form of the mentioned forms has a table that displays the data we stored before and add the new data to this table.

In addition to forms and tables, we made a dashboard page that contains all the tables and the data we have.

The home page is a page that describes the hospital in general not the CMMS system.

## Database.

Each table in the database is to save a specific scope of data related to the clinical engineer job, so let's take a look at the sequence of our database:

## 1. EMPLOYEE

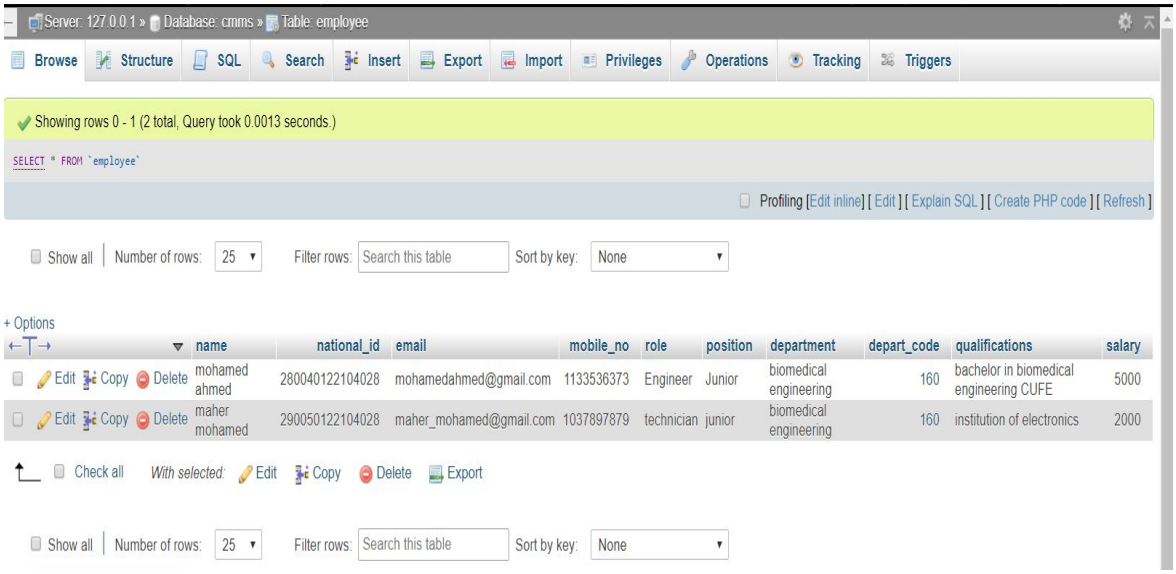


*Figure 1 The Employee table structure which stores the information of Biomedical Engineers (Employee table).*

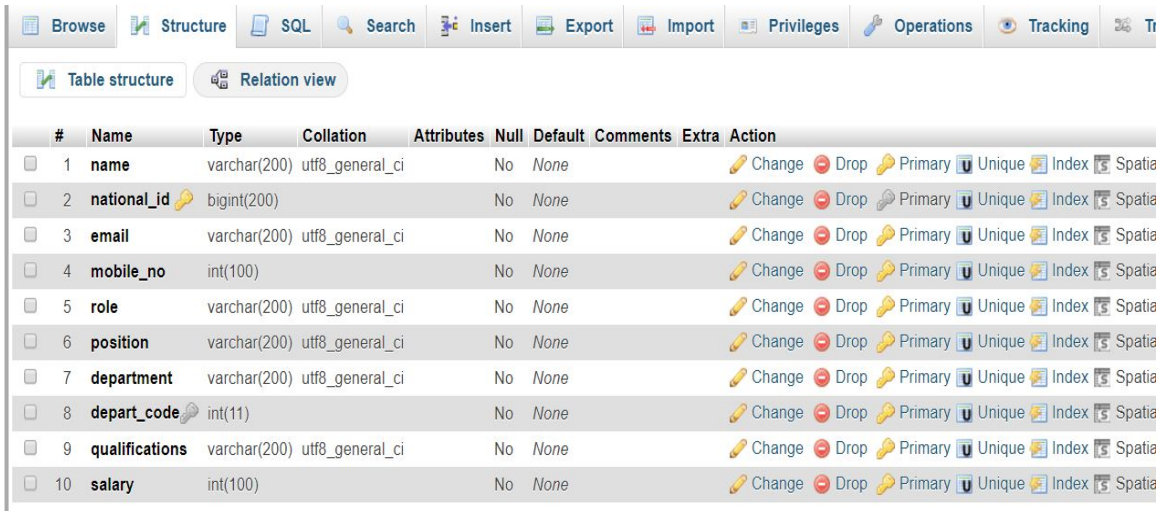


*Figure 2 The data we store about every employee (Structure of employee table).*

## 2. DEPARTMENT

This table we keep the information about each department including the biomedical engineering department , we have chosen OR,IP,ICU,OP,CSSD,LAB,ANESTHESIOLOGY ,OTOLARYNGOLOGY ,ORTHOPEDICS and UROLOGY departments to search and fill equipment data related to these department but mostly we will focus on the first three departments mentioned later on. We are assuming the hospital has 2 branches, each branch has only 1 building constructed of 4 floors

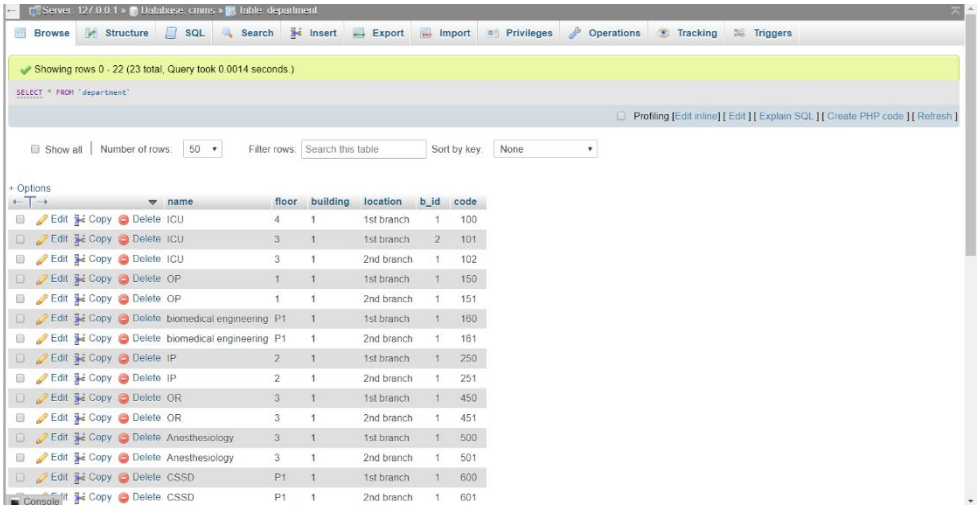


*Figure 3 Department table.*

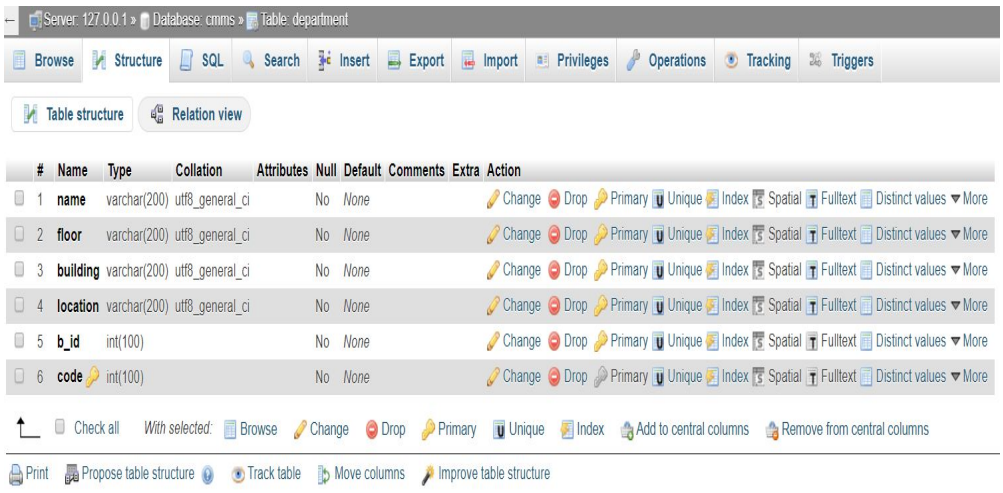


*Figure 4 The data stored about each department in our departments (Structure of department table).*

## 3. EQUIPMENT

Now let's dive deep into the largest table of our database which Has 360 row, each equipment has to be entered into a specific department using the department code. Since each equipment has a unique serial number so it is the primary key for the equipment ,but we mostly will use the equipment id which is also unique for the equipment but is easier to understand and the formula is given by the hospital and all the equipment must be entered on the same way .

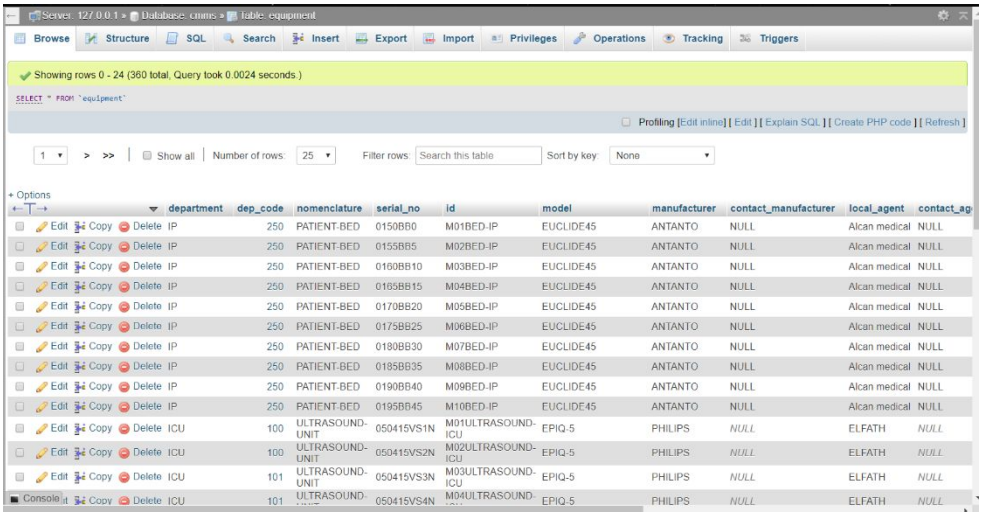


*Figure 5 All the equipment we have in each department (Equipment table).*

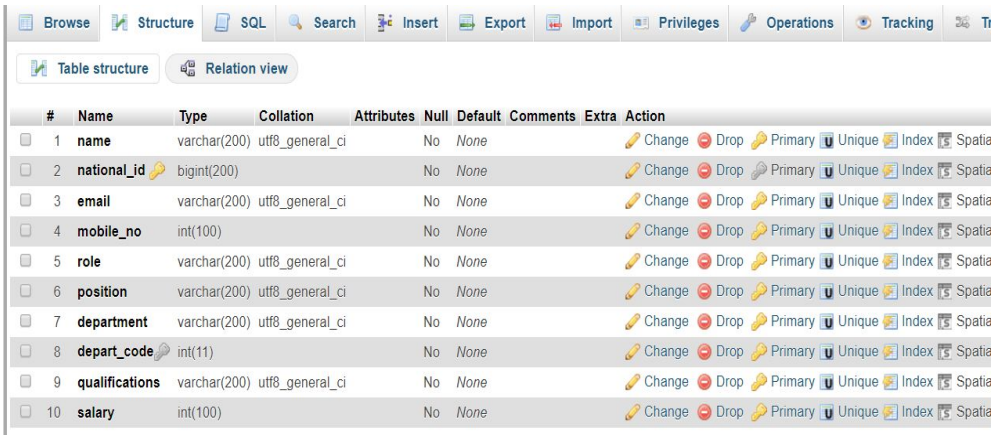


*Figure 6 The data we store about each equipment (Structure of equipment table).*

## 4. DAILY INSPECTION

To maintain the safety of the equipment we have made a general daily pass for the equipment which checks on the physical condition, batteries, cables or ports or both and run a self-test. These procedures are very important to keep the equipment clean and safe and there's always an update of the condition to the user.

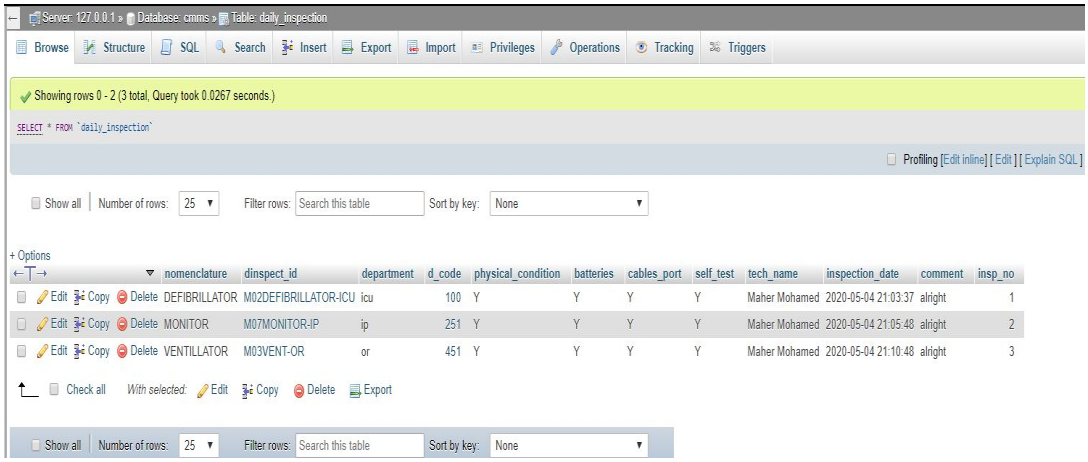


*Figure 7 Daily Inspection Table*

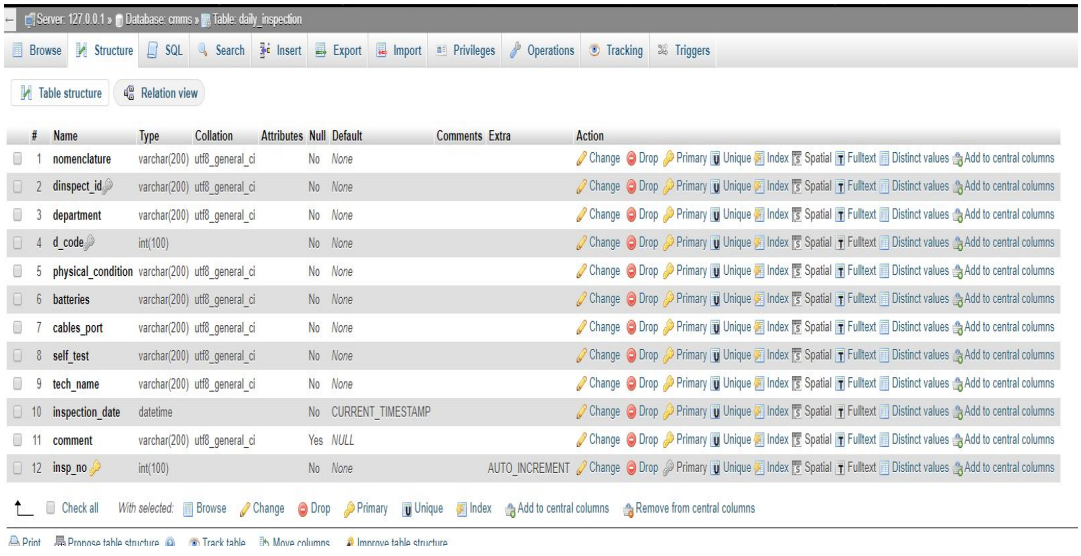


*Figure 8 The structure of each daily inspection table.*

## 5. REPORTS

This table is the heart of CMMS work, whenever a defect or a problem happens with the device one of the biomedical engineering staff must file a report and describe the problem and give an update if the problem is solved or not.

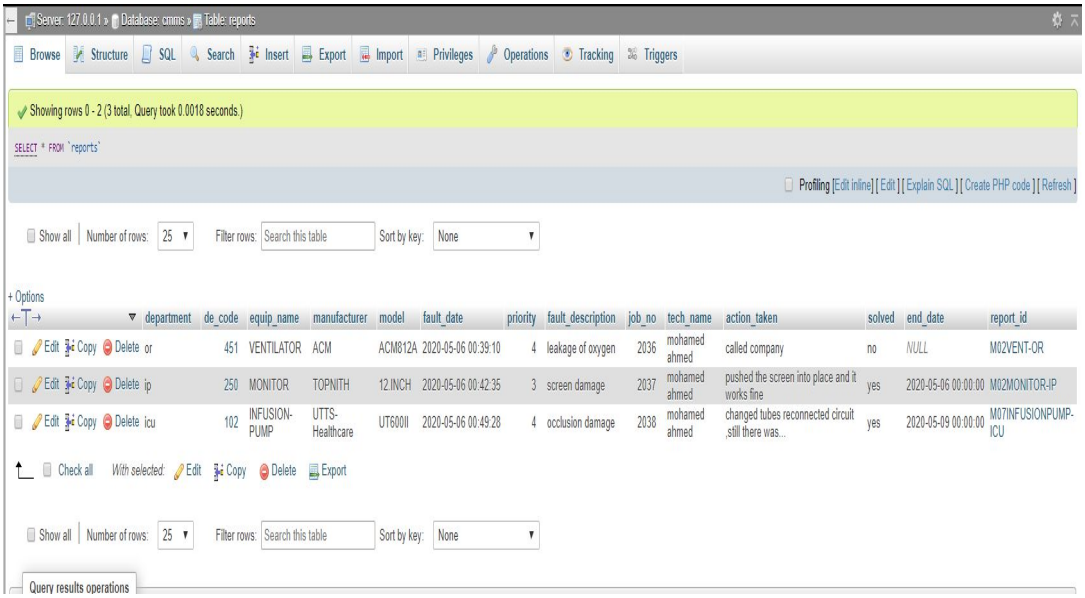


*Figure 9 Report table.*

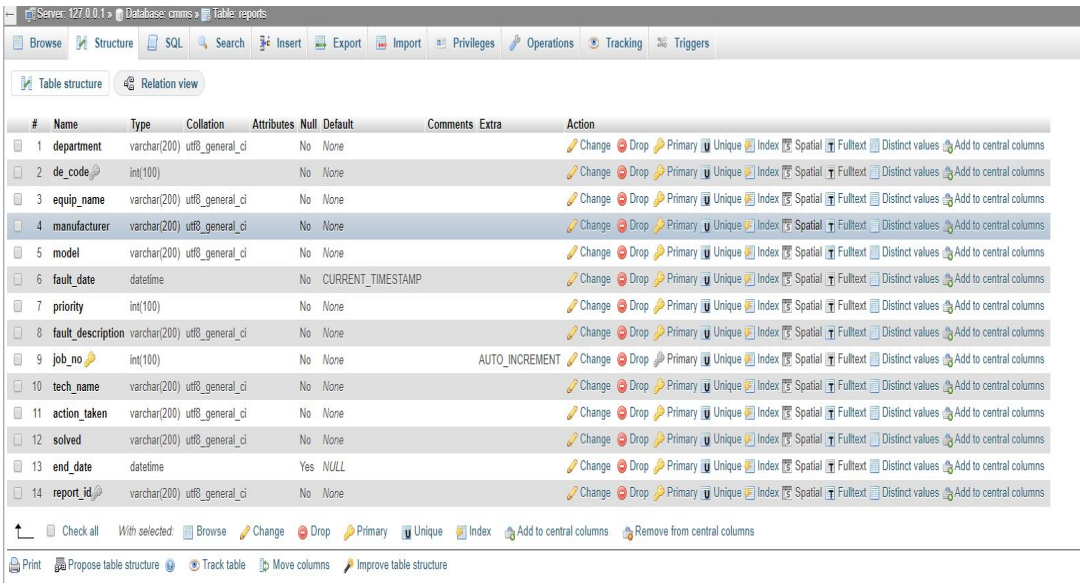


*Figure 10 Structure of each report table*

## 6. PPM

Planned preventive maintenance is very important for the equipment to keep a scheduled check and maintenance on the device. Some equipment have their ppm every 3 month and others each 6 month so it may vary from an equipment to another depending on the equipment, manufacturer recommendation and how vital and frequently used this equipment is.

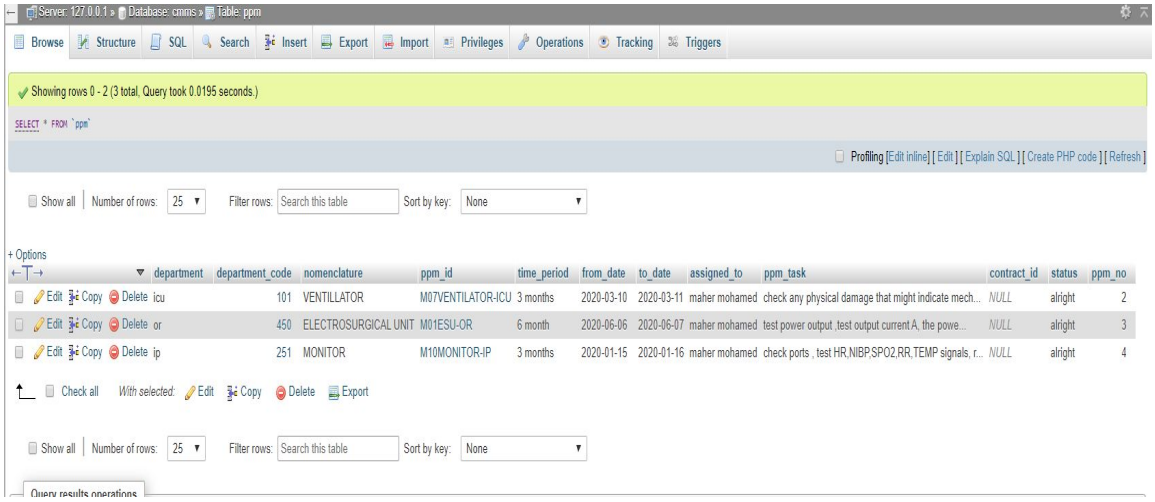


*Figure 11 PPM table.*

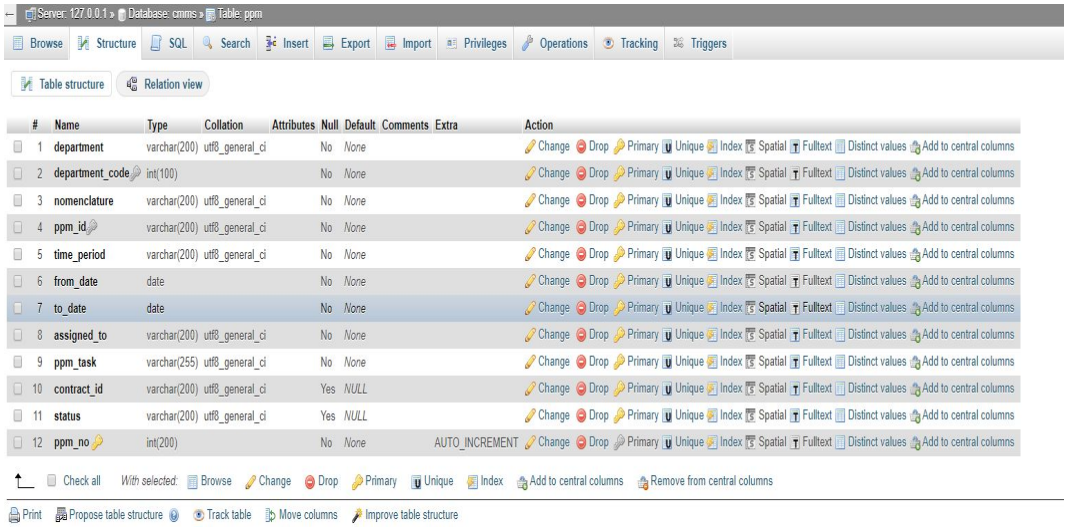


*Figure 12 Structure of each PPM table.*

## 7. CALIBRATION

There's no device that won't need a calibration so this is also a very important table to maintain the safety and accuracy of the equipment. The calibration is also scheduled to maintain the lifetime of the equipment as long as we can.

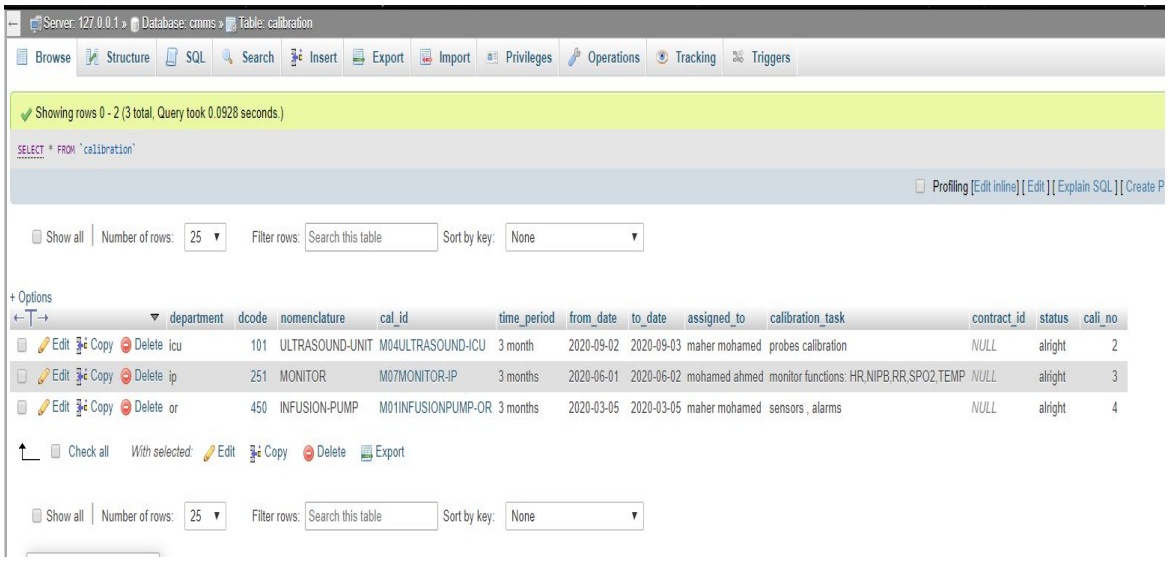


*Figure 13 Calibration Table.*

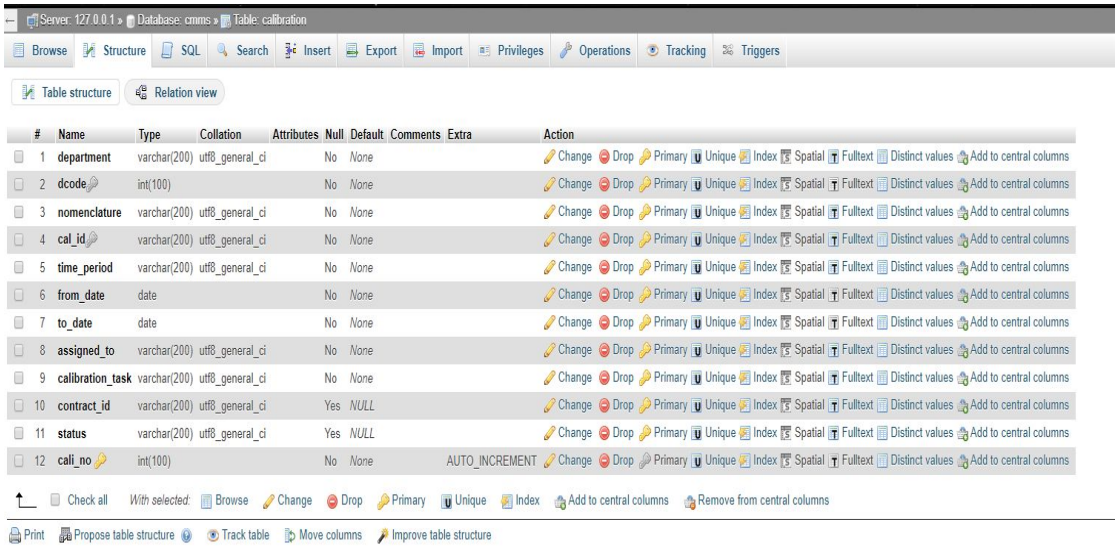


*Figure 14 Structure of each Calibration table.*

## 8. SCRAP

At the end of the equipment journey it will be scrapped , so in this table we insert the device and delete all of its saved info on our database after the deletion date which is probably after years and the reason of this is that the device data might be very useful in many other concerns ,for example : buying a new device and comparing specifications and prices ,legal issues ,..etc.

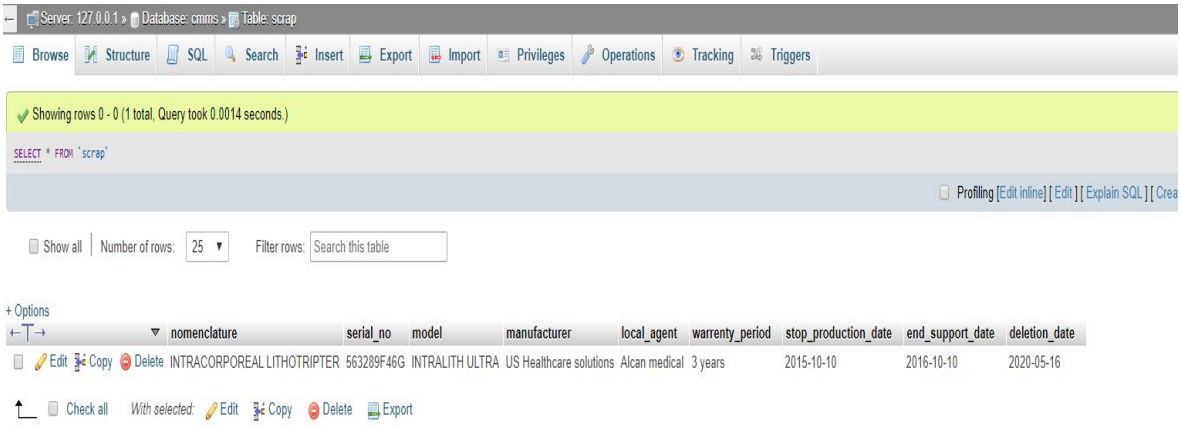


*Figure 15 Scrap table.*

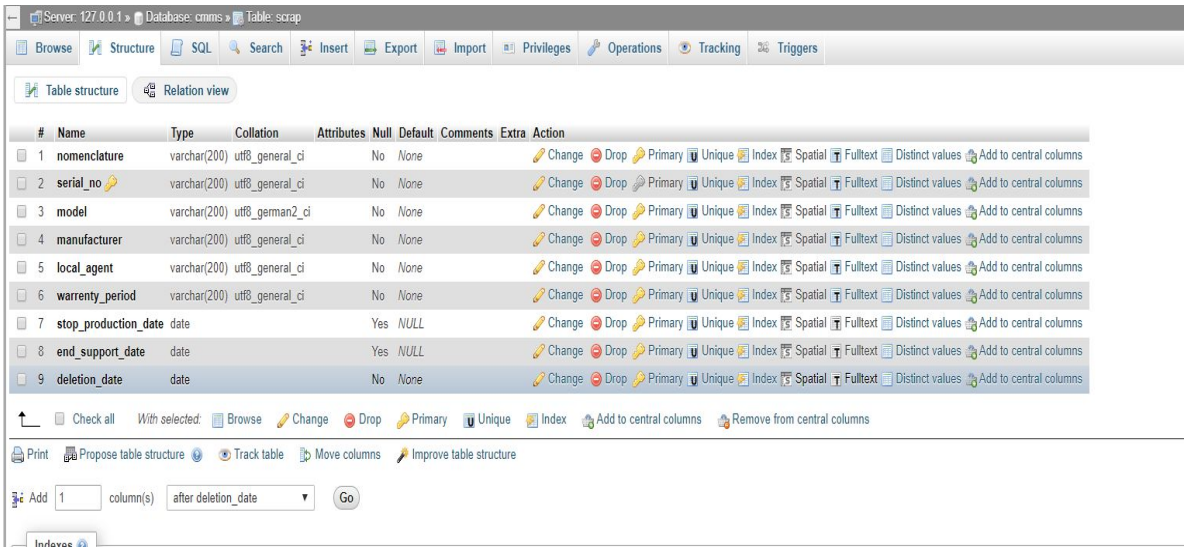


*Figure 16 The structure of each scrap table*

## Sequence to run the project.

1. By using WebStorm application, run the index file until a message in terminal “Listening on port 2000…” is shown and change the port if it is busy in the index file.
2. Go to google chrome or any browser and write “localhost:2000”.
3. The login page will be accessed, by using this username and password our system will be accessed.
    - username: YoussefMohamed
    - password: YouM01998
4. The home page will be displayed, you can choose any of the features we have from the navbar.
5. By choosing add (to insert a new data for employee, equipment or department). You can choose this feature.
6. To display the data, you can choose to view the tables/reports we’ve.
7. To show the data for all the system, you can go to the dashboard page.

## Results.

We took many screenshots to the tables we’ve in our CMMS.

1. EMPLOYEE TABLE.

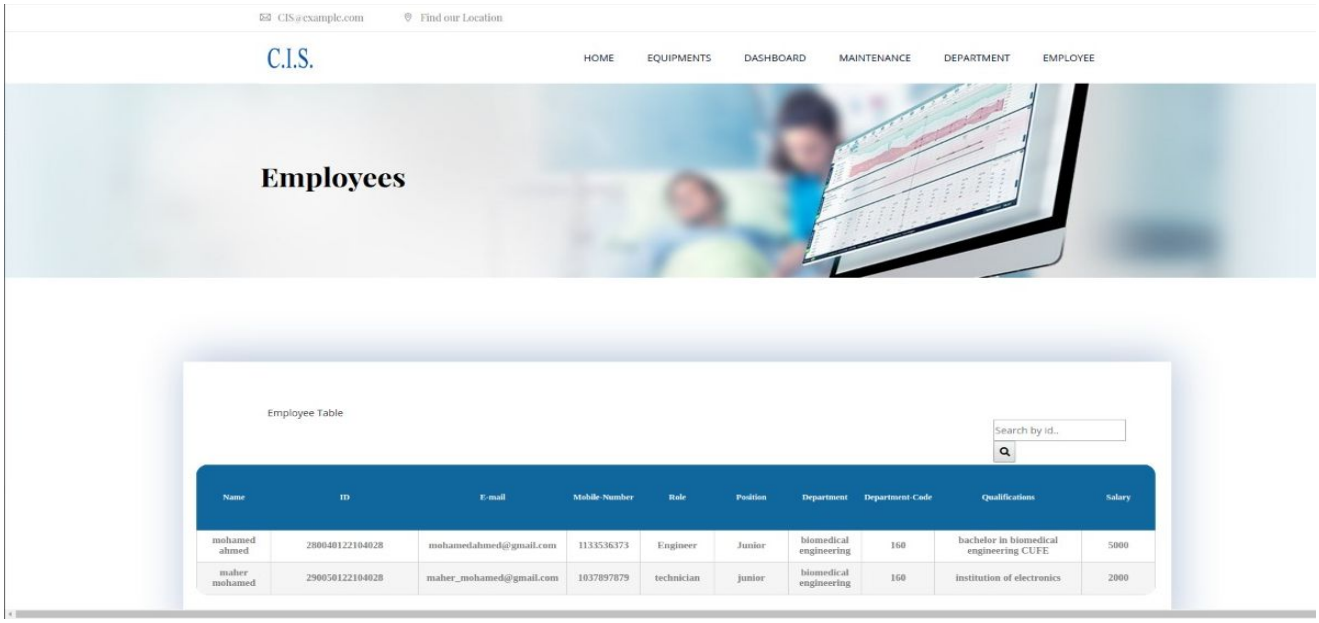


*Figure 17 The data of employees is shown here.*

## 2. DEPARTMENT TABLE.

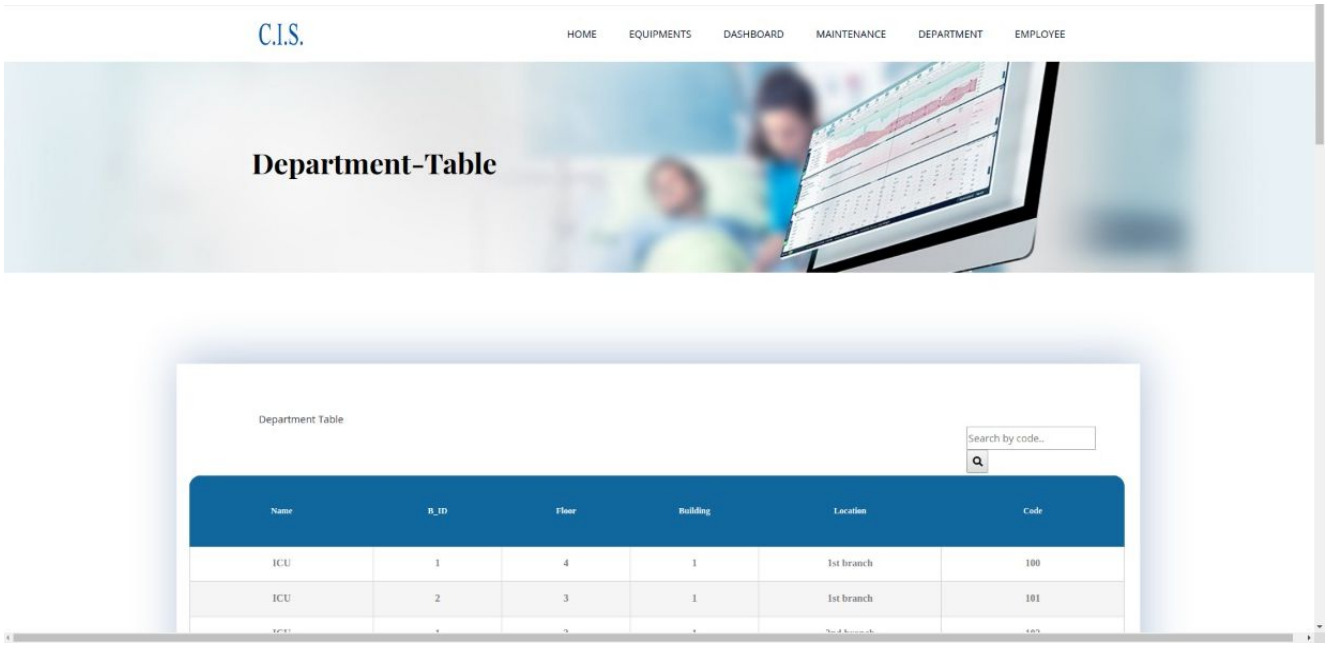


*Figure 18 A. The data of each department.*

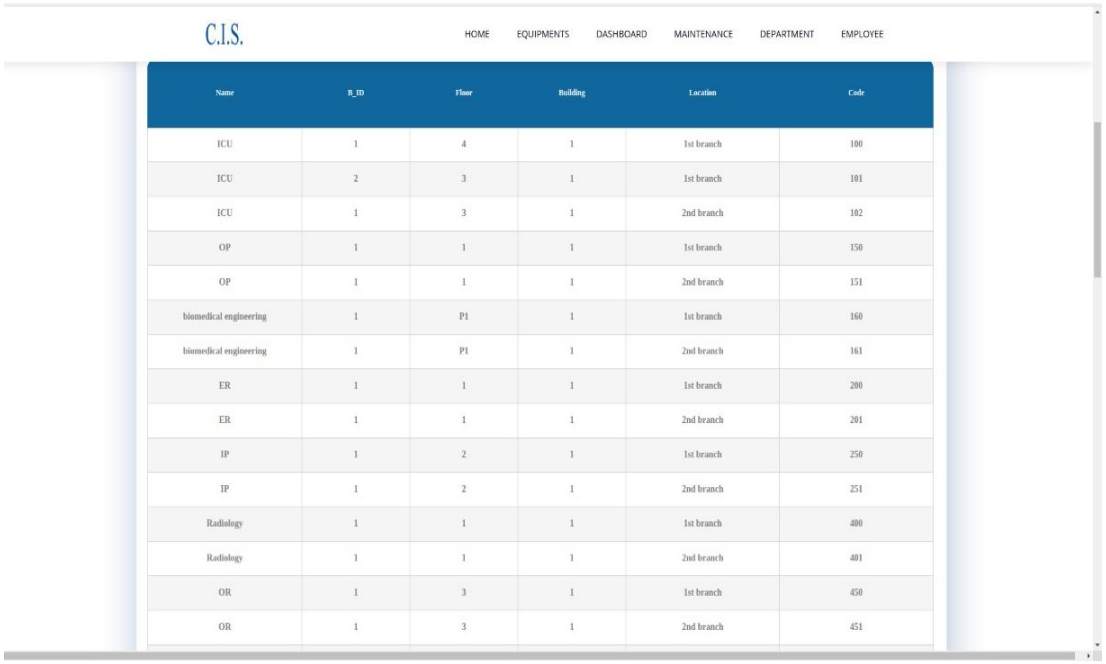


*Figure 19 B. The data of each department*

## 3. EQUIPMENT TABLE.

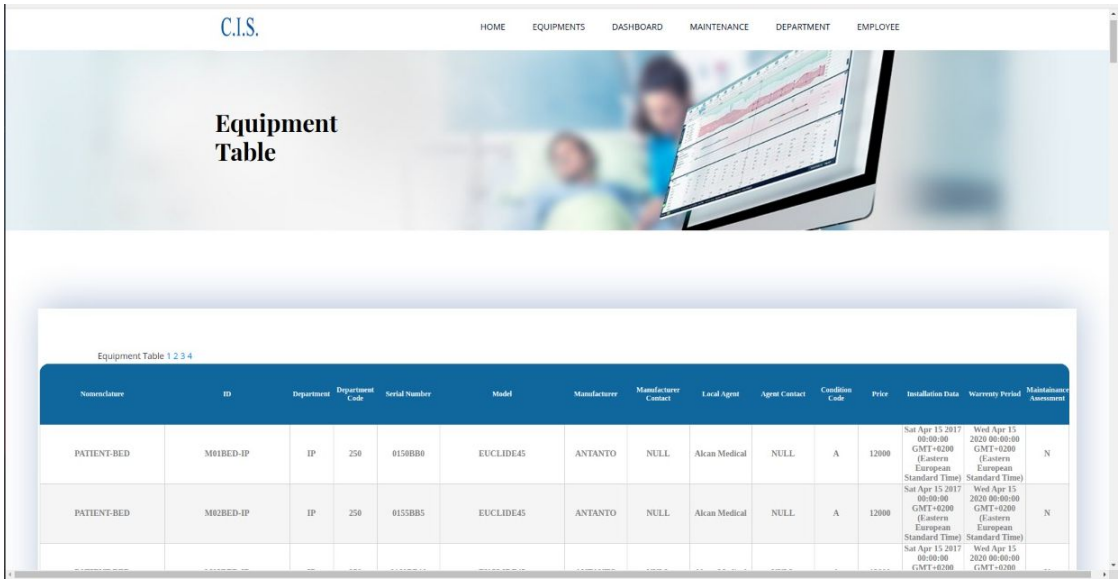


*Figure 20 A. The data for each equipment.*

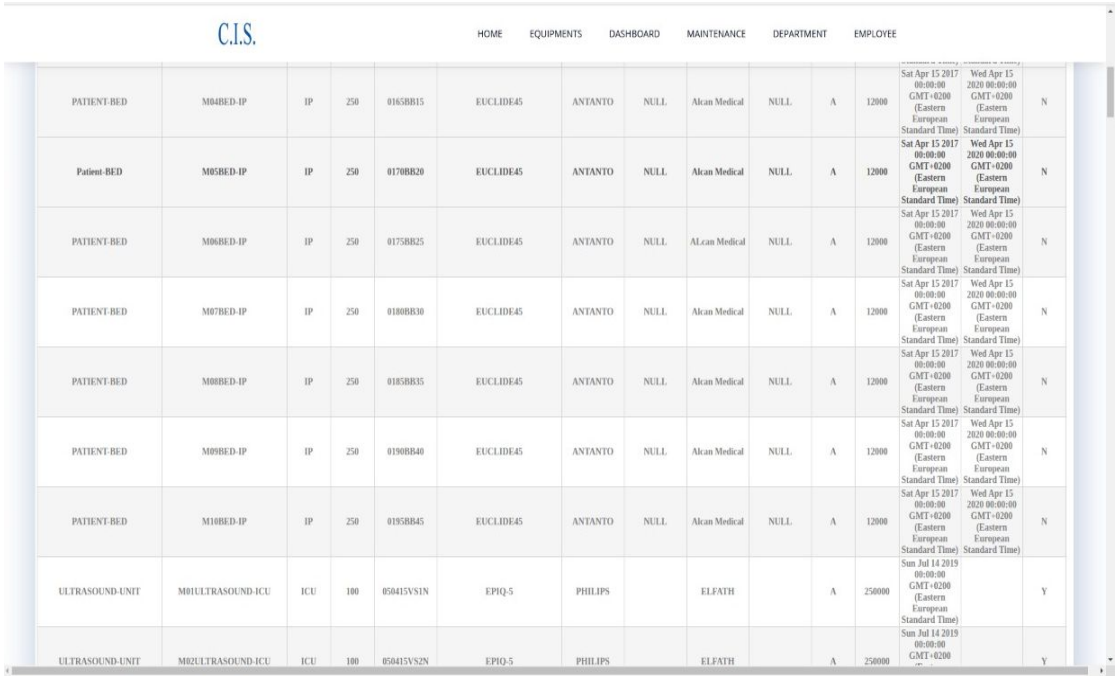


*Figure 21 B. The data for each equipment.*

## 4. DAILY INSPECTION TABLE.

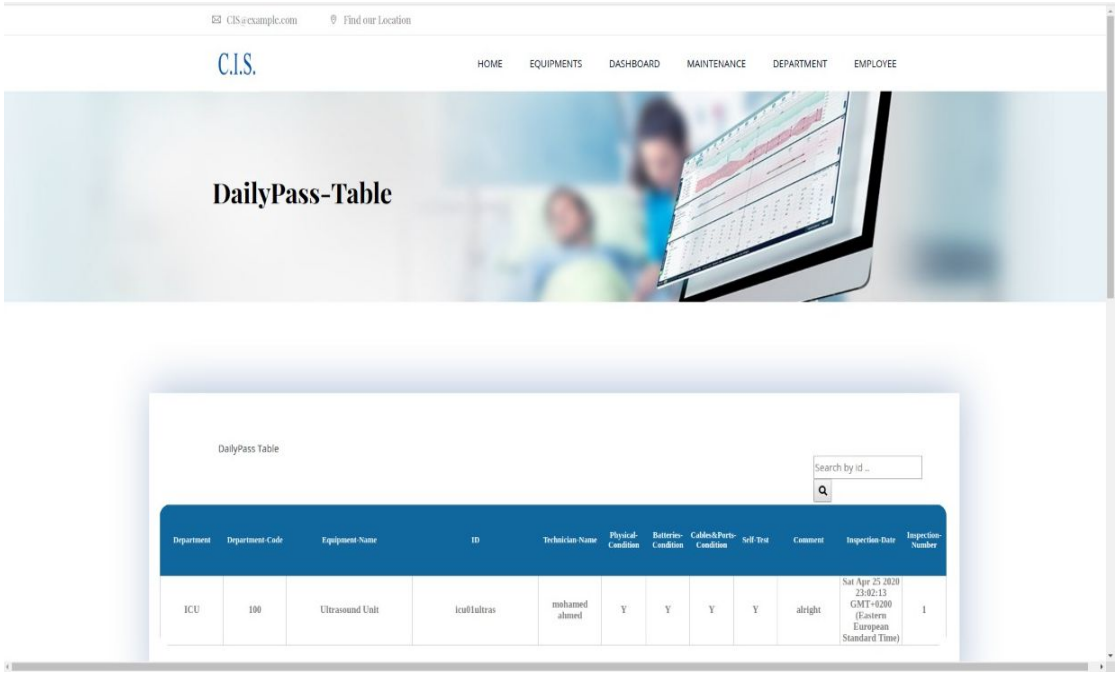


*Figure 22 Data stored for each daily inspection.*

## 5. REPORT TABLE.

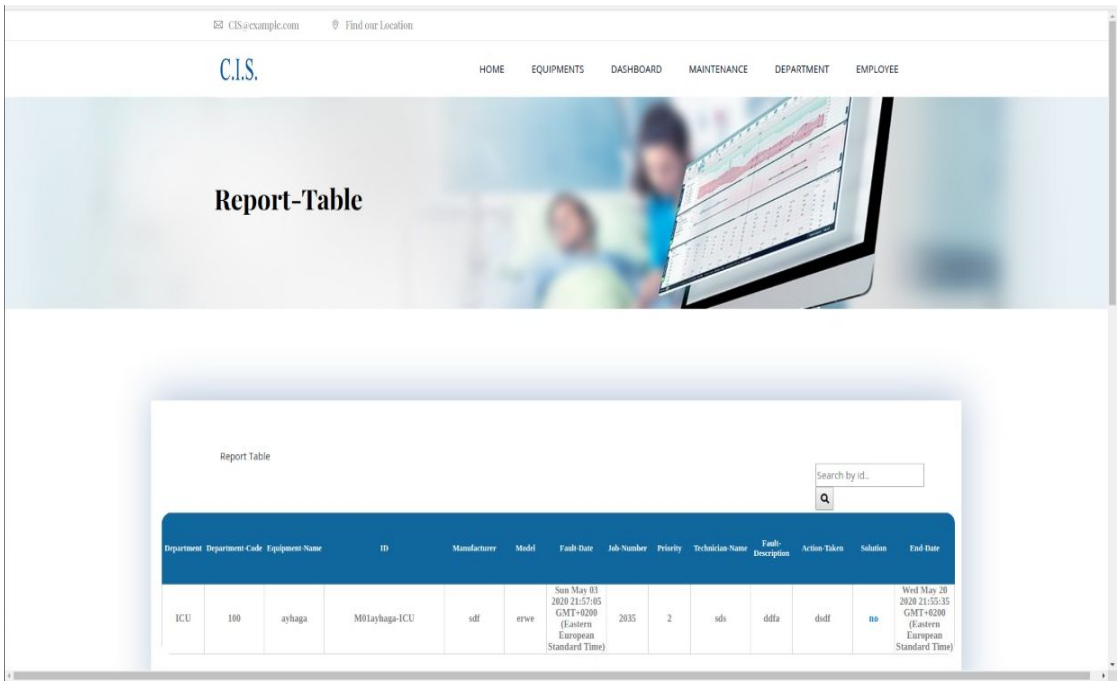


*Figure 23 Report data displayed in this table.*

## 6. PPM TABLE.


*Figure 24 PPM table that displays the data stored.*

## 7. CALIBRATION TABLE.

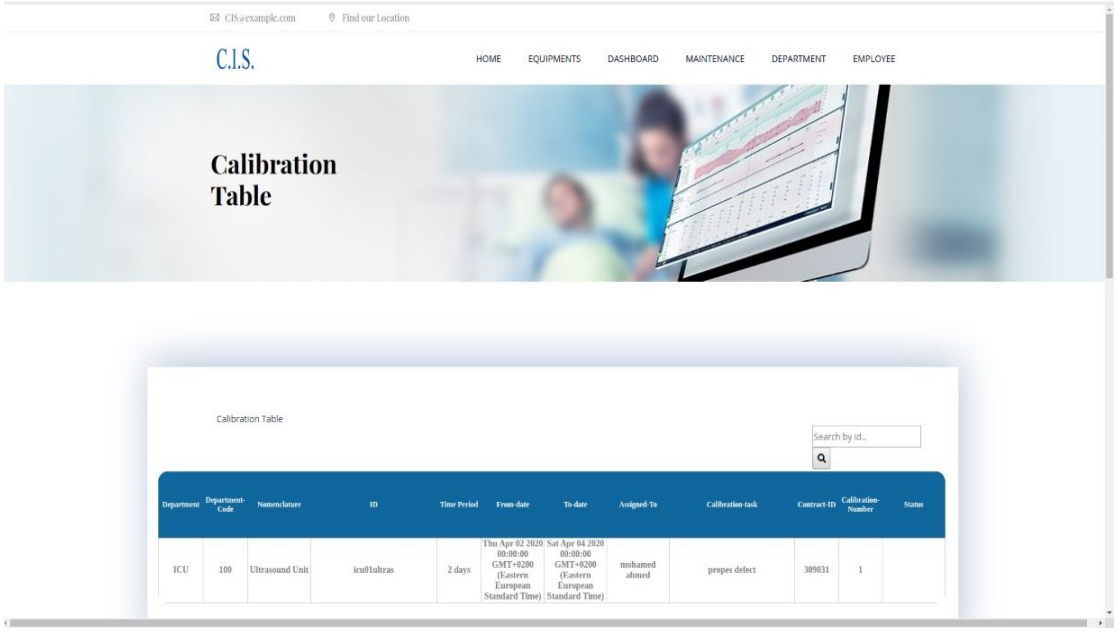


*Figure 25 Calibration table that displays the data stored.*

## 8. SCRAP TABLE.

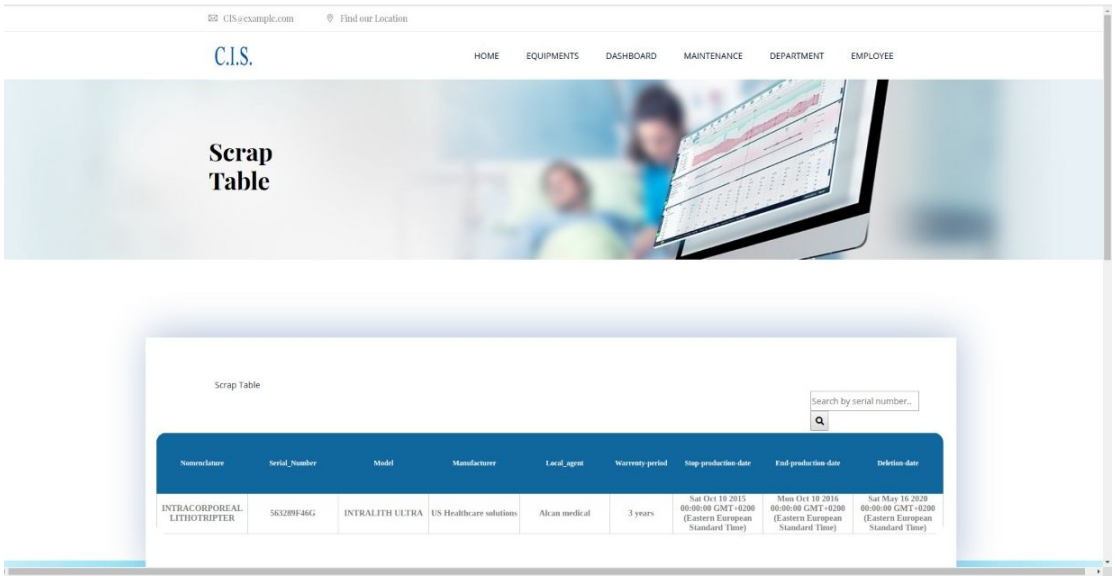


*Figure 26 Scrap table that displays the data stored.*