WEB BASED STOCK AND SALES MANAGEMENT SYSTEM FOR HELIX ENGINEERING

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WEB BASED STOCK AND SALES MANAGEMENT SYSTEM FOR HELIX ENGINEERING.

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This Interim report is submitted in partial fulfillment of the requirement of the Degree

Of Bachelor of Information Technology (External) of the University of Colombo School of Computing

DECLARATION

DECLARATION

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ABSTRACT

Helix Engineering is a Quality Roofing Related Accessories manufacturing company. In today, constructions items have a big market due to lot of constructions have taken place in the country. Previously it was running as a business in a traditional way and it was limited in to a small geographical area.

But today the business has expanded to the several areas Sri Lanka. And also new competitors have arrived to the market. Currently the management is planning to attract more customers and to provide a better and effective service by running the business in a modern way.

For providing a better and effective service to customers, online customer service can be established. Consequently, customers can easily access to the system via web site over internet to get know about the company product details such as available accessories, new accessories and compare their prices without visiting the shop.

Not only that but also Management can use this system to manage product details, manage orders, and check stock levels, need of an online business and etc. So then online system will be act as a media of interaction among the customer, the company and the administration.

Customers will enable to search and buy products, pay for them online and after that products will deliver to the customer without coming to the shop physically.

Considering with client requirement, the system was developed using (PHP Hypertext Processor) open source server side scripting language. As the database tool for designing the database, My SQL was used. Apache 2.4 web server was chosen to run the system. Additionally, Net Beans IDE 8.0 was chosen as the coding Tool and Adobe Photoshop CS6 was selected as the interface design tool in the basic steps of developing.

The new system has been developed to overcome the existing problems and it will help to the administration to achieve company goals and to compete with market effectively and efficiently.

AKNOWLEGMENT

I owe my great gratitude to many people, who helped and supported me to complete my project successfully.in the first place I would like to Thank UCSC for giving this valuable opportunity to follow a world recognized degree program.

My sincere gratitude goes to my project supervisor Mr .H.M.D.S. Herath ,Senior Lecture of ESOFT Metro Campus for guiding me in this project and providing timely needed assistance to solve problems encountered during the project development process by spending his valuable time on my project discussion sessions.

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ACRONYMS

WWW- World Wide Web

XAMMP- Cross Platform (x) for Apache MySQLI PHP Perl

MySQLi - MySQL Improved

UAT –Use Acceptance Testing

AJAX –Asynchronous JavaScript and XML

CSS – Cascading style sheet

GB- Gigabyte

GHz - Gigahertz

HTML – Hypertext Markup Language

PHP- Hypertext pre-processor

Json – JavaScript Object Notation

MB - Megabyte

SHA1- Secure Hash Algorithm 1

SSMSHE – Stock and Sales Management System For Helix Engineering

NIC – National Identity Card

PDF- Portable Document Format

RAM – Random Access Memory

RUP – Rational Unified process

SQL – Structured Query Language

URL – Uniform Resource Locator

DB – Database

CHAPTER 1. INTRODUCTION

1.1 About the Helix Engineering

Helix Engineering is a whole sale and retail sale steel sheet products manufacturing company which was started in 2008.

Products consist with a range of all the sorts of steel sheets products that are used in present constructions such as roofing, Cladding , Gutters, Valance Board, Down Pipes, Louvers, Channels and Accessories ('G' Brackets, Roofing and nails) etc.

They do not have an automation information system for current sales process. As the result of developing the business more and more, daily tasks have become more complicated. Therefore they have to face so many problems including high time consuming for data processing and data conflicts, difficulty in data sharing. There is high probability of getting inaccurate data and is high insecurity of the manual system.

The company needs to overcome these problems and to make easy to their current customers as well as target new customers and to set their name to compete their rivals.

1.2 Web Based System

Currently they are using a manual system to record the data about their process/ production activities. The aim of this study is to study the way of using the modern technology effectively to solve the problems in the operational system and manage the business when the operation becomes unmanageable level. Web based system is needed to handle these operations in effective and accurate way.

1.3 Objectives of the Project

Main Objective of the stock and sales management system for Helix Engineering is to provide a systematic way to manage and collect data from day to day activities of the company which have done through the manual system. Apart from that the system will increase the efficiency and effectiveness of the process.

Other objectives as follows,

- To keep stock at sufficiently over the re-order level and to perform production and sales activities smoothly. Therefore the production process is not halted and demands of customers are duly met.
- To minimize investments in stock at minimum level to maximize probability.
- To Increase the efficiency of sales activities improve customer service through the web site.
- To improve security of the information through user management of the system.
- To generate reports for making easy to get decision about the company.

1.4 Project Scope

Account management

The administrator

The administrator is the person who manages the overall system. Administrator has full authority over the system. Administrator /Manager can add, activate/ deactivate, change, and confirm orders which are made by customers. Administrator can add and change details about new and existing products. Administrator can also manage user accounts. Administrator is responsible to keep the system running while responding users' inquiries and supporting them.

New Users

New users are the visitors who use or visit the web shop first time and do not have create any user account with the system previously .They may browse the products and then view product details. But they may not make any order.

To place an order, they must have to create an account. The context diagram shows the flow of information between different nodes of the system and how the system responds to the incoming requests. The interaction of all stakeholders with system can also be understood with this context diagram. It also tells us that what kind of tasks this system and other stakeholders can do.

Registered Customers

When placing the order, customer has to register with the system by providing required information such as name, email, contact number. etc.)

Shopping Cart (online shopping management)

It shows the status of the user's purchases and his or her account balance. It updates automatically when user selecting some products to purchase.

Order processing

Customers can place direct orders and online orders according to searching results and their preferences and requirements**.**

Payment Methods

The system displays all the available methods that are used by the company for payments. Users can select the method of their preference from the drop down list.

Complaints

For every system, there is necessary to have a feedback system or complaining system where users can submit their problems which will support to the organization to improve their facilities and services and also identify drawbacks of the service.

Supplier module

For every product, there will be a supplier and based on the required stock, specific supplier is contacted for requesting stock. This module will maintain supplier details based on various categories.

Product management

According to availability of products in stores, they are divided in to different categories which will help to inventory system for collecting system to collect specific product from that category.

Customer can see all the products which are available for the users. Admin can add new categories, delete and edit them through the admin control panel.

CHAPTER 2. ANALYSIS

2.1 Introduction to Analysis

Requirement analysis, is also called as requirement engineering, is the process of determining user expectations for a new or modified product. These features called as requirements which must be quantifiable relevant and detailed [1].

In the requirement gathering, requirement techniques are used to gather requirements about current system (how the current system work, draw backs, functional and non-functional requirements of the system).And then the similar system reviews are contained.

2.2 Requirement gathering techniques

After identified sources, there are a number of techniques to gather requirements. Clear understanding on the system requirements directly effects on the last outcome.

Studying Documentation:

Studying Manual system and other documentation is a good way of collecting data about the steps that are involved in an activity.

Researching similar systems

By observing and analyzing a similar system, it is very easy to establish the requirement to a new system.

Interviews

Interviews are good for getting people to explore issues. Semi-structured or unstructured interviews are often used early on to elicit scenarios.

Observation

Observation of participating in their natural setting is used to understand the nature of tasks and the context in which are normally performed.

2.3 Current System

High level use case for Existing system

Use case diagram for Existing system shown in the *Figure 2.1*

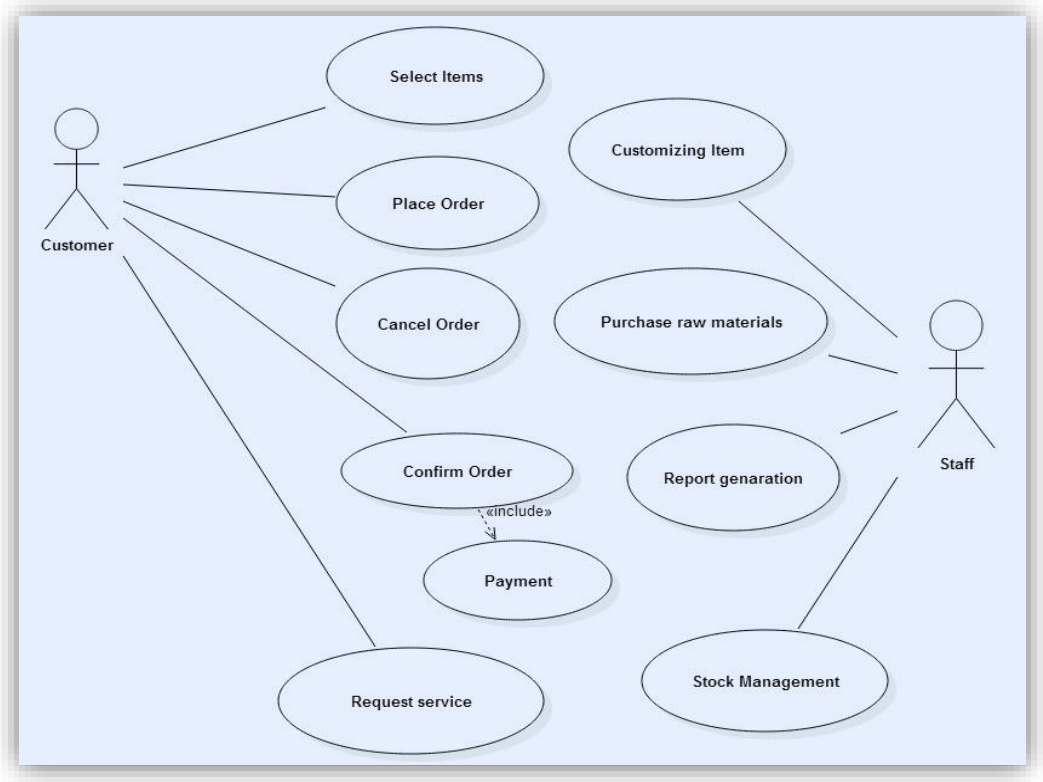


Figure 2-1 High level use case for existing system

According to the above use case diagram current system can describe as below.

Ordering Process

In this manual process, firstly the customer meets the owner/manager of the company and discuss about the idea. Then the appropriate design of the product is selected from the catalogue (photo album, design album).Another option is selecting the product according to the customer idea. In this process, customer has to describe his own criteria clearly to the manager. There are special readymade products that are designed by the company. If customer satisfies with products, they can order it. These activities are done through the face to face discussions. Canceling or modifying is being carried out of using the same process.

Product and Accessories management

Each of these Products has many attributes and they are different from each product. Each Sub product generates with combining its different attribute values. Unit price is calculated on different attributes .Therefore it is a complex and important task to manage products. According to the manager, there are more than 1000 Products.

Example product and accessories shown in *Figure 2.2*

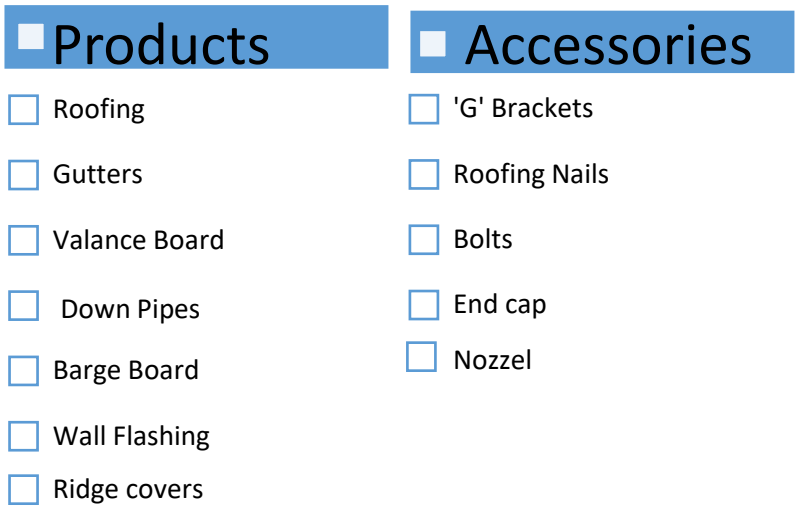


Figure 2-2 Product and Accessories

Roofing – Customer can select colour, size and gauge of the roofing

Cladding –The protective outer covering on a building or another place .Aluminum sheets are produced as claddings according to the customer needs. Colour and gauge of the product can be changed according to customer needs.

Gutters – Available number of gutter types according to their sizes and shapes

Valance Board-Horizontal facia board which caps the end of rafters outside a building may be used to hold the rain gutter. Customer can select from available width and colours

Down pipes and nozzles– Down pipe is a pipe to carry rainwater from roof to drain or to ground level. Nozzel is a spout at the end of a pipe. According to the shapes and size customer can customize the product (rounded, square shape).

Ridge covers – a ridge of a sloped roof

Manufacturing process

Manufacturing is a totally practical scenario. Company manager of the company informs to the employees to fulfill customer's requirements or design.

Purchasing raw materials

Aluminum sheets are the main raw material for the product. Purchase quantity is decided by the manager according to the placed order details and previous sales records.

2.4 Functional Requirements

Login/Change password management

Login screen requests credentials from the user to access the system. If invalid data is entered, user should be received a prompt error massage.

System users ought to be categorized into 3 types of accounts. First level is for administrator. Second level is for staff. Third level is for Customers with restriction on account activities.

Staff users are added by administrator. Customer user accounts are automatically created.

Password can be changed by user .When changing password the old password and relevant user name must be provided. New password should be enter twice to confirm the password.

Stock management

An inventory management section provides details about stock to make easy for decision making.

A Warning alert must be sent when the item stock level drop below the affordable level. Items on ordered section provides details about ordered items and shows what are the items ordered but not received to the stock. It provides list of items they have. Customer only can see product details .Admin can see product and raw material stock level.

When purchase stock is received its details must be recorded into the received stocks.

Order processing

Customer can place orders online or manually in the shop. Each order should be recoded to reference to use again when needed. Recorded orders can be deleted and printed. Inside search option Search orders are included by its number.

If customer is a registered member, details will be automatically filled and discounts are calculated if there are any discounts are available for them.

Report generating

Management of the company makes decisions based on reports generated by the system. Report generation module enables the user to generate various reports that are important to management to make decisions.

Ex:-

- Inventory report
- Received stock report
- Purchase order report
- Item on order report
- Expiration reports
- Payment to vendors report
- Sales reports

Shopping cart

Act as an online product catalog and ordering process. It allows customer to select items, review what they have selected and make necessary modifications or additions and purchase it.

Product Customization

Customer can buy readymade products produced by the company or customize the product. When customer sends a request for customization, shop keeper considers it and reply if it is possible or not.

2.5 Non Functional Requirements

Reliability – Always the system should be functioned properly without any time restrictions

Availability – Any time system should d be available and accessible for the users.

Security – System security is a very important because customers' personal details and many other confidential details exchange through the system. If that information is accessed by unauthorized person then it will make a big issue. Authentication of username and password helps to identify authorized users and their user levels.

Portability – Defines the ability of the system to be installed on all necessary platforms. (Windows, Open source)

Scalability – System should be able to handle an increasing work load

2.6 Similar systems

Here are two similar systems to the proposed system.

2.6.1 Inflow Inventory

This is an inventory management system designed specifically for item based business. Inflow inventory helps its users save time on paper work. But it's cannot manage product items in proposed system. Interface of inflow inventory system is shown in *figure 2.3.*

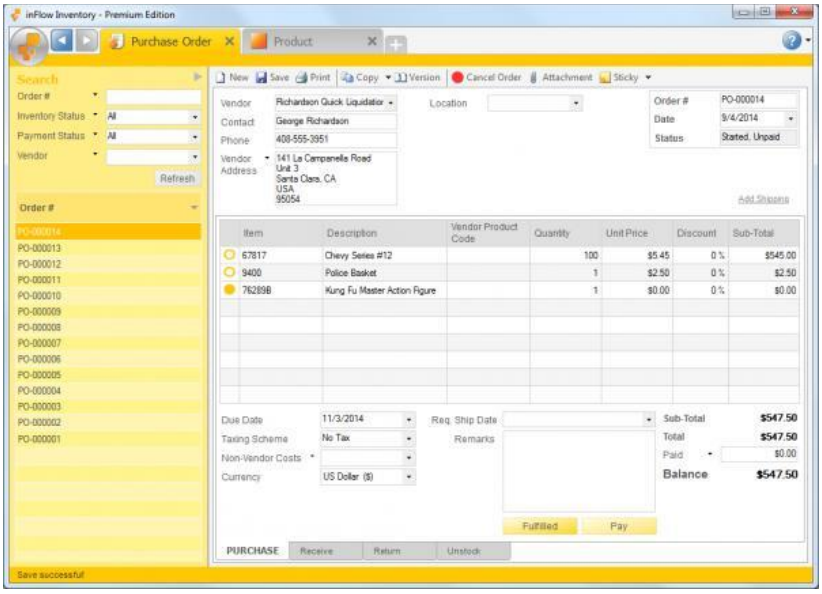


Figure 2-3 inflow Inventory Interface

2.6.2 Westman Steel

Figure 2-4 Similar systems [2]

This site is about metal product manufacture. It has product categorization according to the Product, Industry and Colour. It also gives customers to customize product qualities (colour, gauges, shapes, size).But this system does not have online purchase facilities or shopping cart.

Figure 2.4 Shows Westman Steel logo and *Figure 2.4* Shows 2.5 Web site Home Page

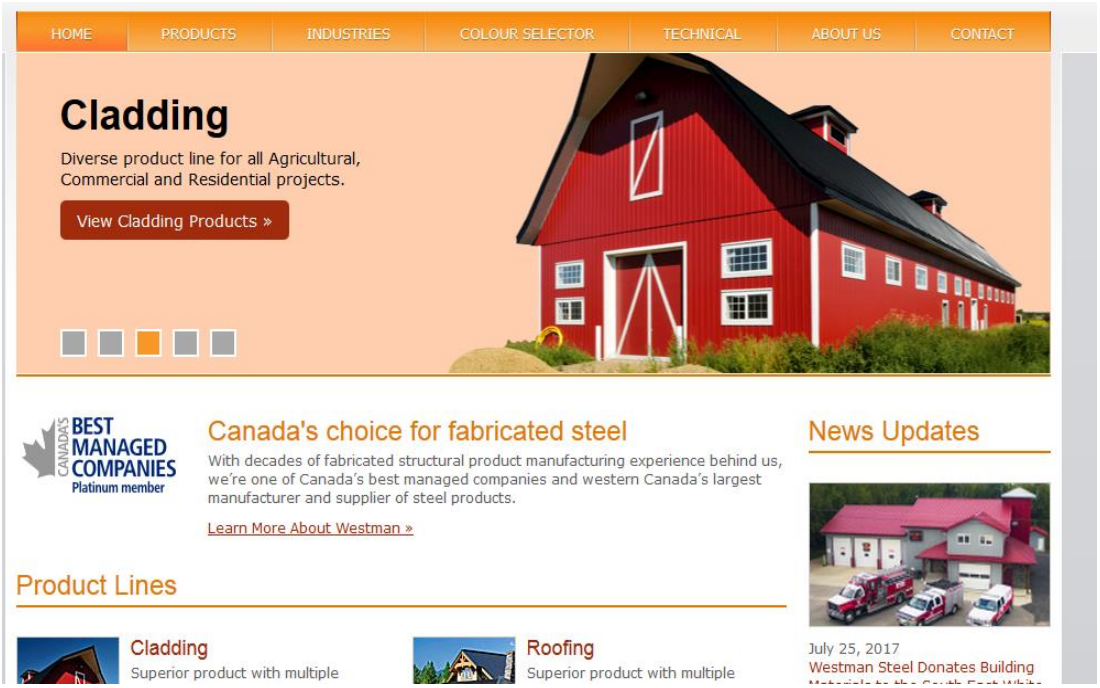


Figure 2-5 Similar systems [3]

CHAPTER 3. DESIGN

3.1 Motivation for the Project

Like most of the businesses Helix engineering has started their business manually with paper works. Afterwards this system has caused number of problems. Inefficient and non-accurate process is time consuming and it has leaded the business to a risk.

Sometimes they do not have a proper idea about stocks. Delaying of raw material purchase is the main reason to this. Misplacements of reports may cause a lot of problems. Management always has to be there to take actions and handle business process. It is difficult to find the manager all the times for handling issue of the process in the work place due to he is engaged with so many works and responsibilities.

There is no proper method to record whole sale and retail order details. There are number of categories according to colors, product types and coil size etc. If products are not produced according to customer's criteria, customers may refuse to buy them. Therefore company has to face so many losses on both financial and physical.

In today most of the people in the society use new technology for their day to day tasks. So in this business, it is very important to have a place in cyber space. It will help to find new customers and to provide easiness to them to search select and buy products online.

3.2 Introduction

In this chapter mainly describes about system development models being used in the current software development industry and what is the model that can be used to develop this system. [4]

3.3 Process model for the proposed system

RUP process model allows to iterative development, change requirements, easy integration of the component and faster development in development process. Therefore RUP process model was better as the process model for this system.

RUP (Rational Unified Process)

Diagram for RUP process is shown in *Figure 3.1*

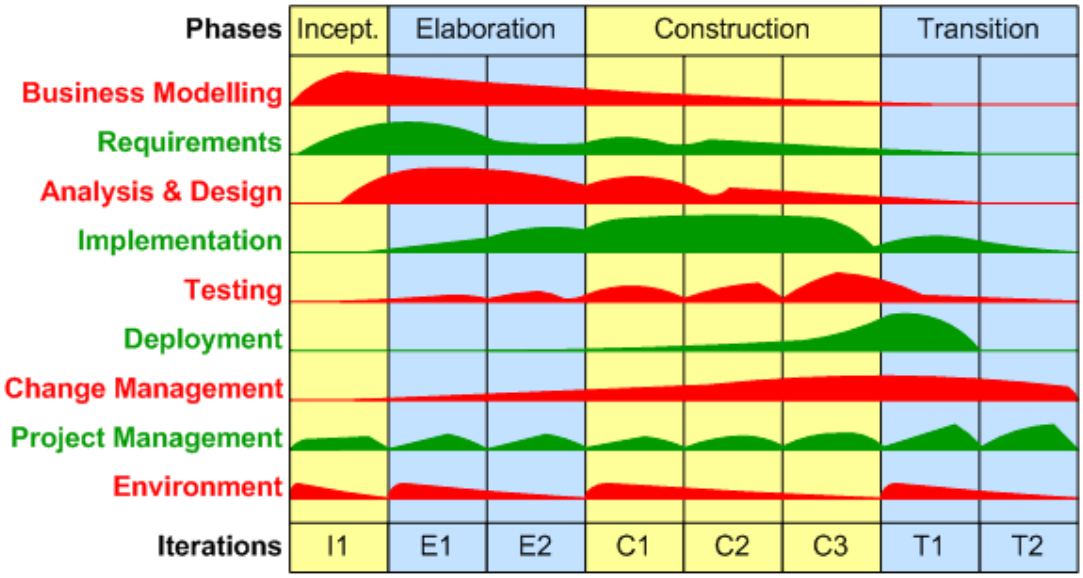


Figure 3-1 RUP (Rational Unified Process) [6]

It is an iterative software development process and it is not a single concrete, prescriptive process. There are four main phases in this process.

- Inception
- Elaboration
- Construction
- Transaction

Each phase has one key objective and milestone. RUP discipline lies in the iterations of development that lie within all the phases.

3.4 UML modeling Diagrams used in for the design the system.

- Class diagrams – Graphical representation of static view of the system. It represents different aspects of the application.
- Use case diagram – This diagram uses to capture the dynamic aspects of the system.
- Activity diagram –This diagram draw the activity flow of the system. Describe on sequence of activities.

- Sequence diagram - Sequence diagram is an interaction diagram that shows how to operate processes with one another and what is their order [7].

3.4.1 Use Case diagrams

Use case diagrams are used to capture the dynamic aspects of the system.

Figure 3.2 Shows Use Case Diagram for Proposed System

Figure 3-2 Module Planning and Design

3.4.2 Stock Management

In this module, it handles the inventory, stock index that will be maintained by shop keeper by adding, modifying item details, deleting item details from stock index. The

inventory is auto updated according to regular sales, when goods are bought with the purchase order. System will help user with day to day updated information regarding the inventory status. Manager can interact with Inventory module activities.

Figure 3.3 Shows Use case Diagram for Stock Management

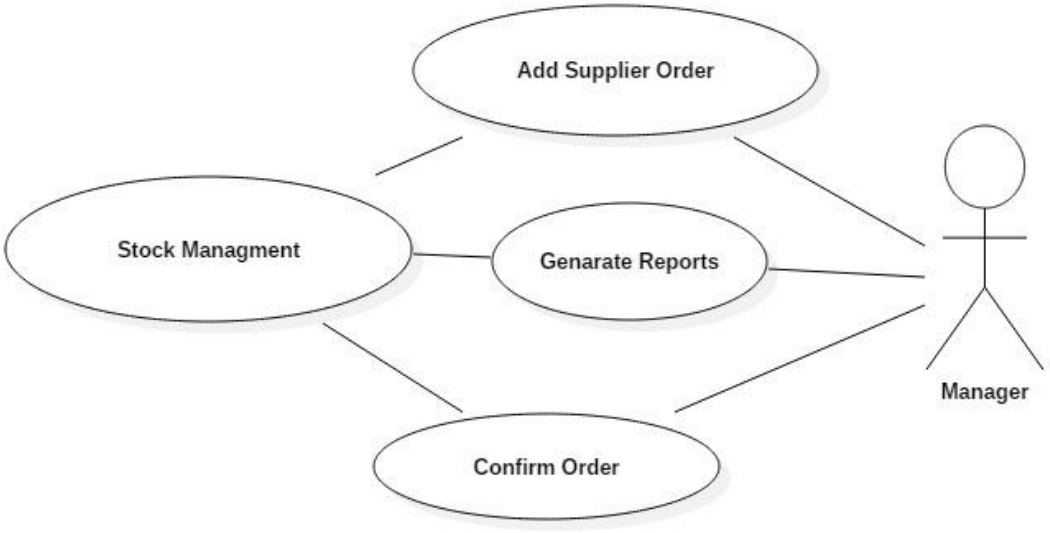


Figure 3-3 Stock Management

Use case Description for Stock management.

Table 3.1 shows Use case Description for Stock Management

Use-case	Manage stock details
Actor	Manager, Administrator
Overview	
Manage products quantities on stocks.	
Precondition	
System user should be log in to the system.	
Flow of events	

User log in to the system.
If purchase new items/sheets relevant item quantity should update.
In order processing relevant stock details should update according to order confirmation details.
User can view, updated the status of the stock.
Post conditions
Stock details should accurately modify and store in the stock.

Table 3-1 Use Case Description for Stock Management

3.4.3 Product Management

Figure 3.4 Shows Use Case Diagram for Product Management

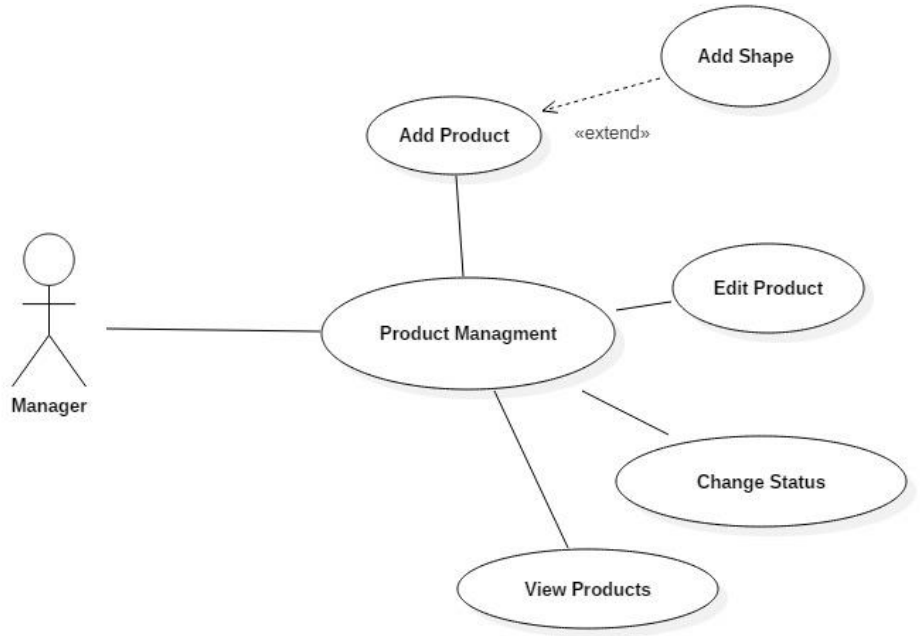


Figure 3-4 Product Management

Use-case Description for Product Management

Table 3.2 shows Use case Description for Product Management

Use-case	Manage Products
Actor	Staff
Overview	
Manage products on stocks.	
Precondition	
System user should be log in to the system.	
Flow of events	
User log in to the system.	
User can add active/deactivate and modify products Information.	
User can view, updated the status of the inventory.	
Post conditions	
The added, modified item details added in to the stock index.	

Table 3-2 Product Management

3.4.4 Purchase Order Management

This module is used to handle purchase orders; manager can use this module to generate the purchase orders. When stock level becomes low, system will show that and auto generate the purchase order for relevant items. According to the special reasons (demand, season) manager can add, edit, and remove item details from the purchase order. After approving the purchase order system will update the Inventory.

Figure 3.5 Shows Use case for Purchase Order Management

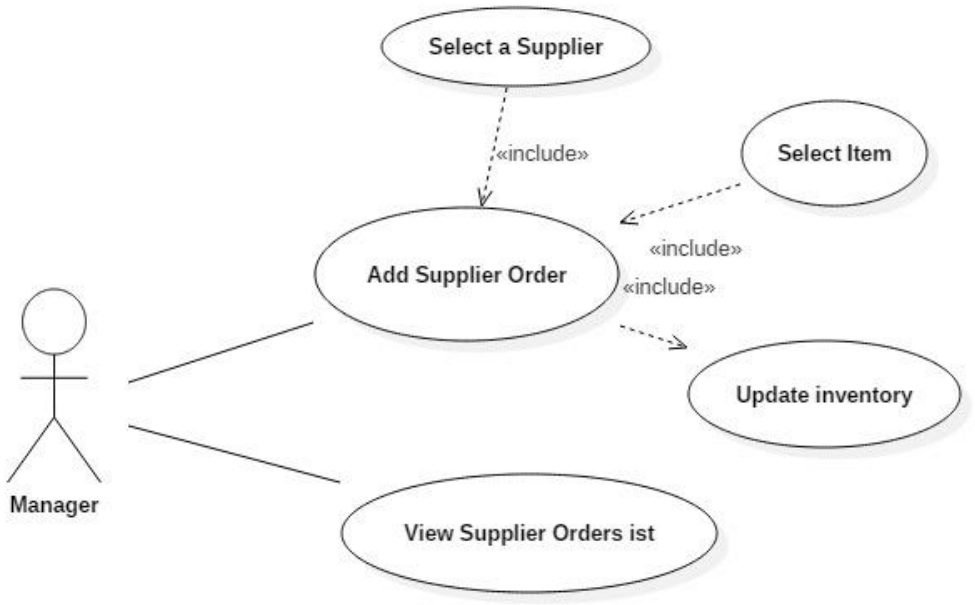


Figure 3-5 Purchase Order Management

Use Case Description for Purchase Management

Table 3.3 shows Use case Description for Purchase Management

Use-case	Manage Purchase Order
Actor	Staff
Overview	
Manage Purchase Orders.	
Precondition	
System user should be log in to the system.	
Flow of events	
User log in to the system.	

User can add purchase order.
User can view purchase order list.
Post conditions
The added, modified item details added in to the inventory.

Table 3-3 Purchase Order Management

3.4.5 Order Processing Module

Order processing module handles orders which are placed by the customer. Customer can log in to the system (Customer should register) and request for an order on line. Product items can be viewed, added to list and item quantities, colours, can be changed or item can be removed from the order before submitting. Staff (Manager) will respond to the pending order requests by accepting or rejecting. According to that customer order status will be updated by the system. Confirmation email will be sent to the customer. If it is a direct order, shop keeper enters above details to the system and place an order.

Figure 3.6 Shows Use case for Order Management

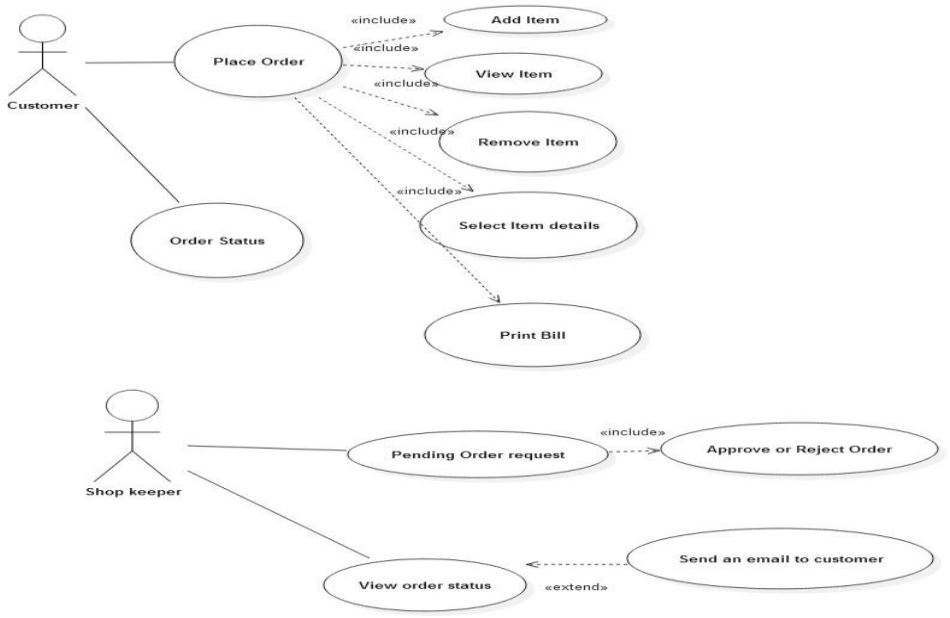


Figure 3-6 Order Processing Module

Use Case Description for Order Management

Table 3.4 shows Use case Description for Order Management

Use-case	Manage Customer Order
Actor	Staff OR Customer
Overview	
Manage Customer Orders.	
Precondition	
System user should be log in to the system. Customer should be registered	
Flow of events	
User log in to the system.	
Customer can add, and print purchase order.	
System User can Add, approve view order.	
Post conditions	
The added, modified item details recorded in the system.	

Table 3-4 Manage Customer Order

3.4.6 Database Design

Figure 3.7 Shows Class Diagram for the Proposed System

Figure 3-7 Database Design

3.4.7 Activity diagram for place an order

Figure 3.8 Shows Activity Diagram for Place an Order.

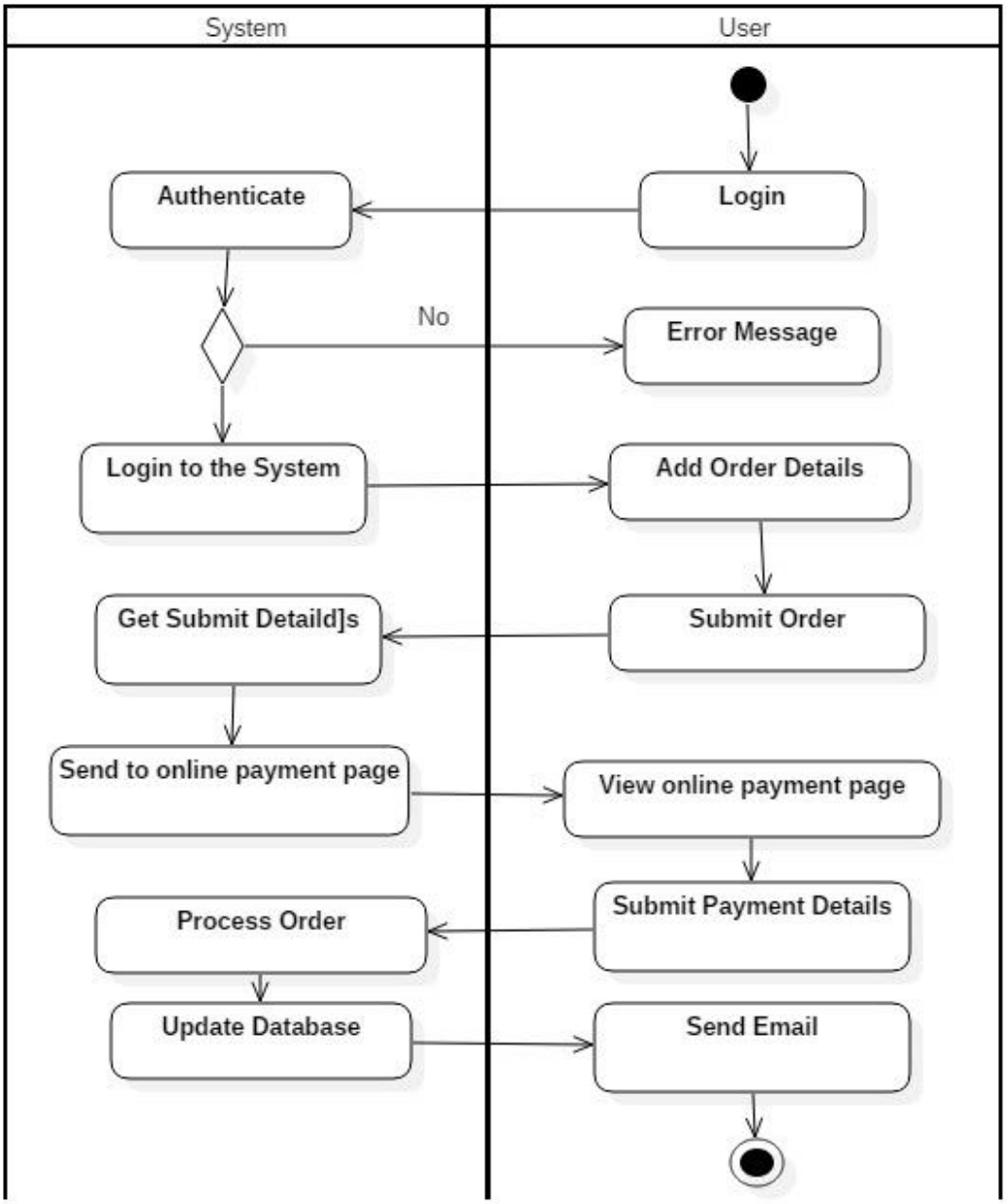


Figure 3-8 Activity Diagram for the Order Processing Module

3.4.8 Sequence diagram for Order processing

Figure 3.9 Shows Sequence Diagram for Order Processing

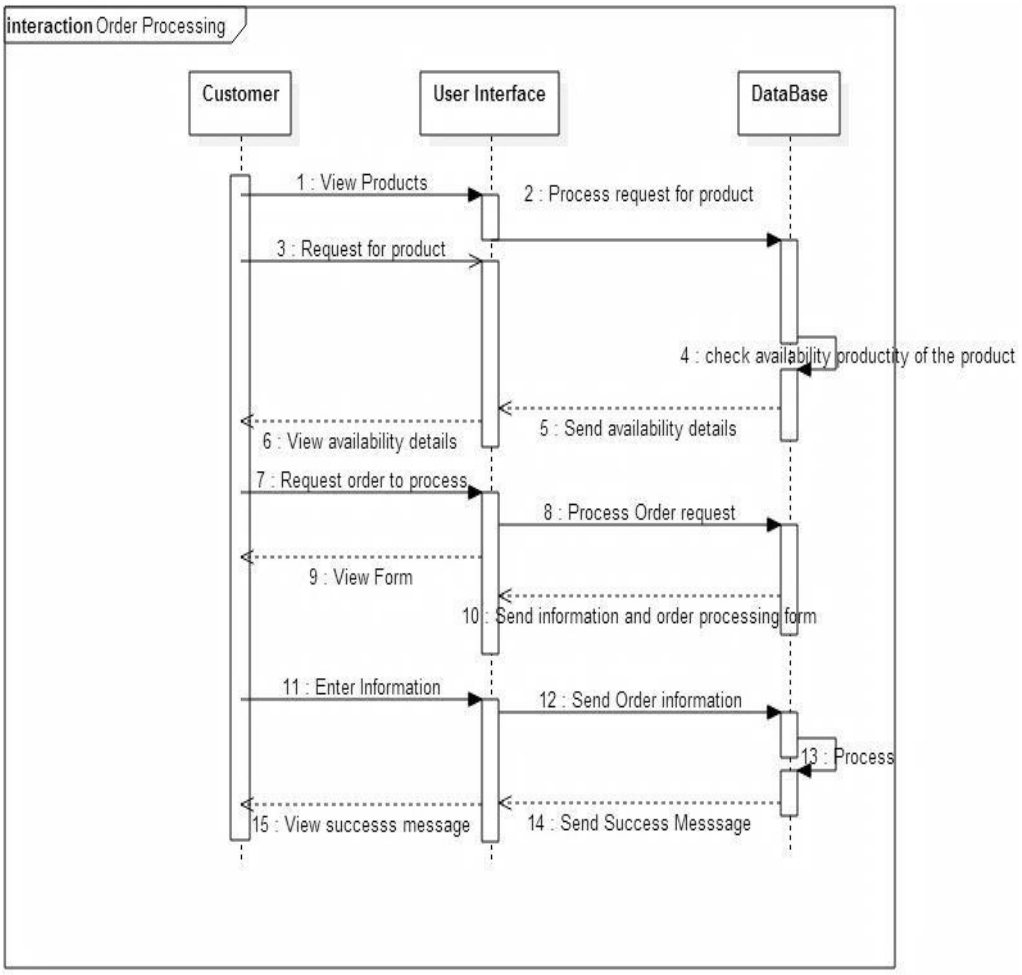


Figure 3-9 Order Processing Module

3.5 Class Diagram

Figure 3.10 Shows Class Diagram for the Proposed System

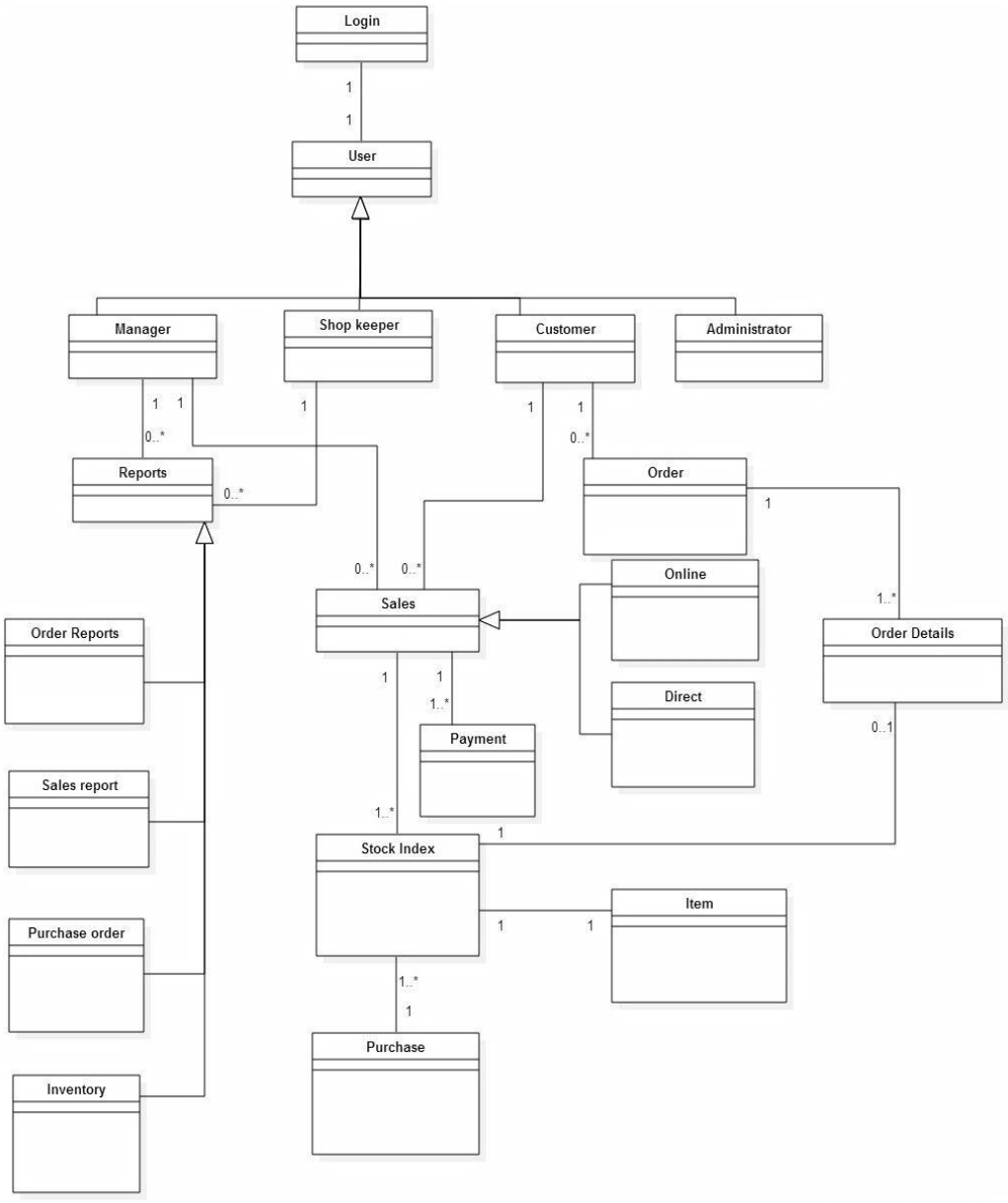


Figure 3-10 Class Diagram

3.6 Interface Design

User interacts with the system through the system interface and the system should be more attractive to keep customers who are attached with the system. When considering the developing of the system, suitable colors and understandable commands should be applied in system. Because of that among all the components of the user interface are very important.

A successful user Interface needs to be,

- Forgiving
- Efficient
- Responsive
- Clear
- Familiar
- Attractive and user friendly.

3.6.1 Add Order Interface

It belongs to the website, Order module, under order tab.

There are two separate forms for product and accessories. Using the radio button user can select product form or accessory form. Product and its colour can be selected from the drop down list and the quantity can be provided as text format by the users. When user select the product from the dropdown menu, its attributes, unit price and image are shown according to that. Total is calculated by using unit price and quantity values.

When submitting each form of information is shown as a table using j Query. After adding all products and accessories total amount of products is shown below in the table.

Figure 3.11 Shows User Interface for Add Order Product

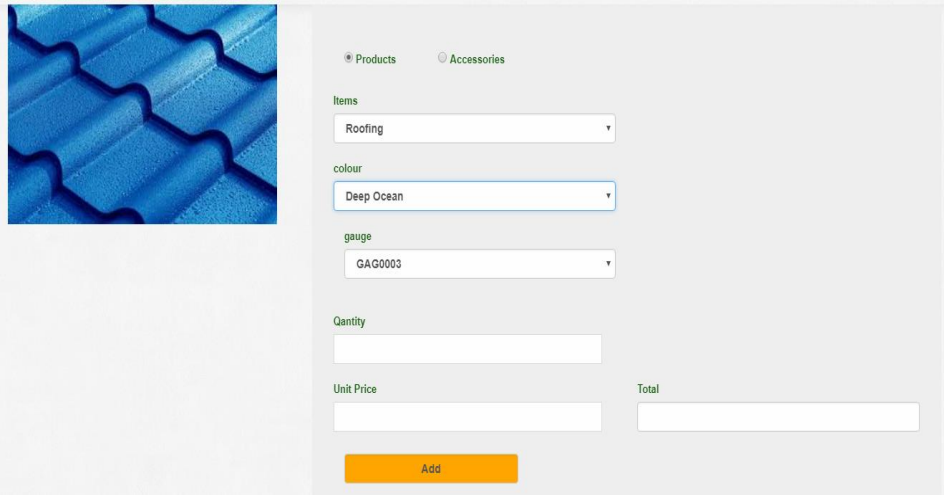


Figure 3-11 Add Order Interface

3.6.2 Add Employee page

After adding information, data is validating by using Java Script. Information are sent to the Data base using MySQLI and responses are displayed to the user.

Figure 3.12 Shows User Interface for Add Employee

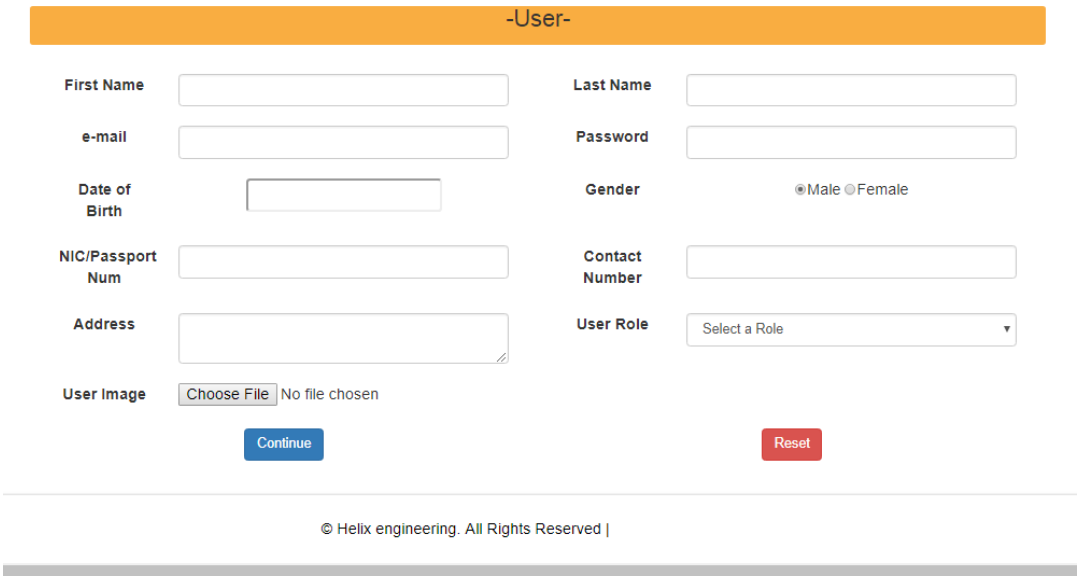


Figure 3-12 Add Employee page

3.6.3 View Employees Interface

Figure 3.13 Shows User Interface for View Employee

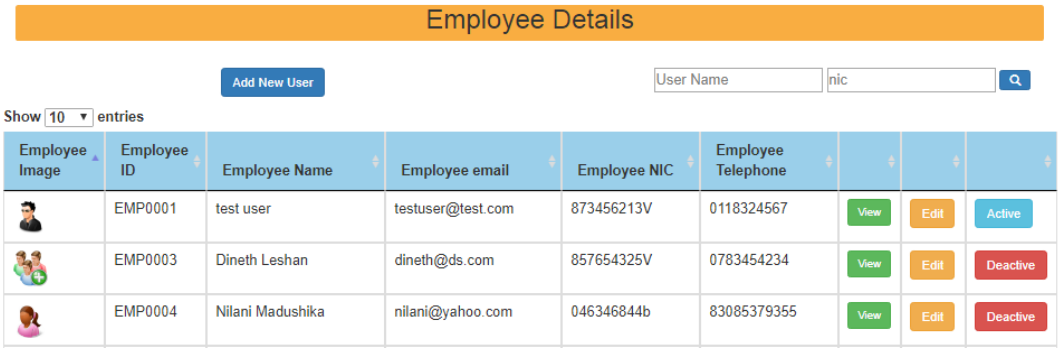


Figure 3-13 View Employees Interface

Employee Details shows user interface for "View Employee Details". User can search Employees through NIC and User Name. Using Pagination, user can change Number of Employees shown in each page. Using "Add New User" button, user can go to the Add Employee Page. User can view "Add New User" Interface by clicking "Add new User" Button. Employee Status button shows whether users are active or deactivate. Edit Button directs user to Edit User Page shown below.

3.6.4 Edit User Interface

Admin can Edit User information using edit user Interface. If User need to deactivate an Employee user has to unchecked the checkbox.

Figure 3.14 Shows User Interface for Edit Employee

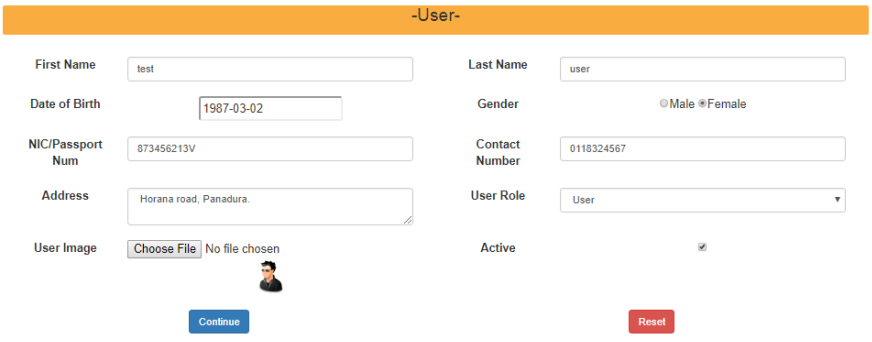


Figure 3-14 Edit User Interface

3.6.5 Add Product Interface

"Add Product Interface" belongs to the product model. First the user has to enter Product name and select Product category .Then user has to add product gauge /gauges, shape/shapes, width/widths as if it has.

As third part user has to select what are the components that effect to assign Unit price.

By clicking on the check boxes, user is able to select colour and material.

This process is completed by using java script and ajax.

Using all the combinations given below in the table shows sub items coming under this product type. User has to give Unit Price and Re- Order level to each Product sub item. All this information are added into Product, Gauge, Shapes, Price Attribute, width, Product Detail tables in system Database by submitting this page.

User Interface for Add New Product shown in *Figure 3.15*

Figure 3-15 Add Product Interface

User Interface for Add New Product Attributes is shown in *Figure 3.16*

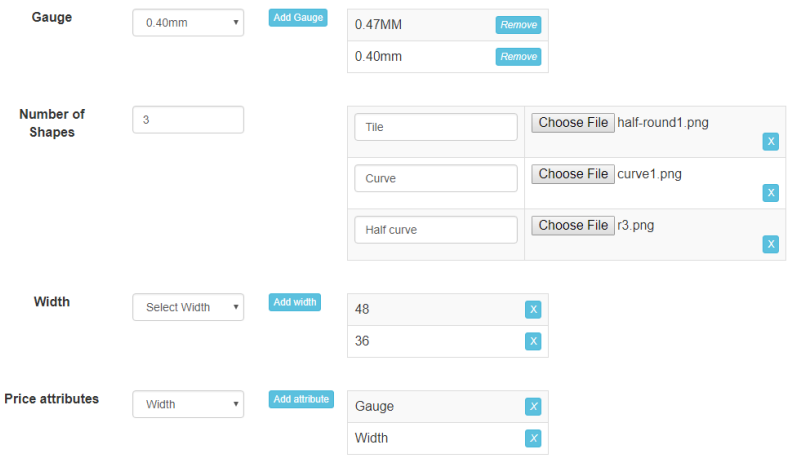


Figure 3-16 Manage Product Interface

User Interface for Add New Product Prices shown in *Figure 3.17*

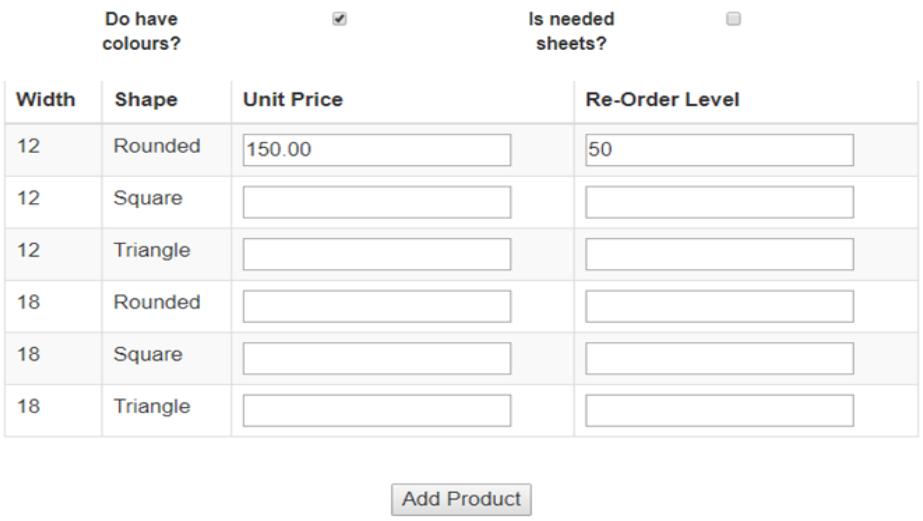


Figure 3-17 Manage Product prices Interface

3.6.6 Add Supplier Order Interface

Figure 3.18 Shows User Interface for Add Supplier Order

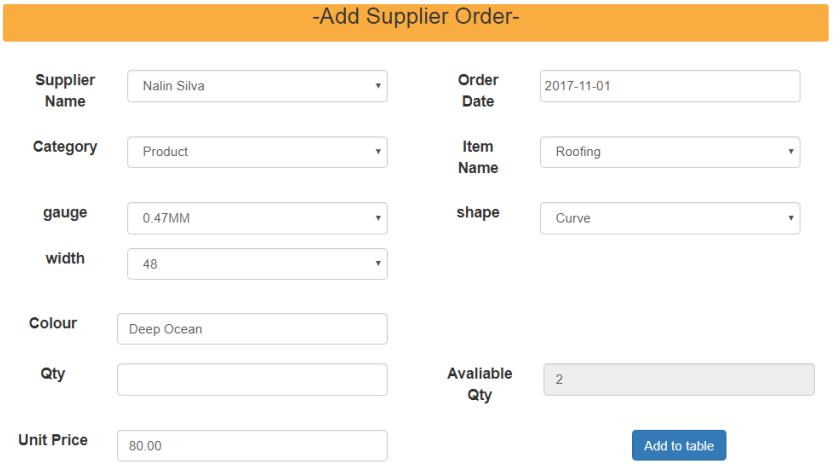


Figure 3-18 Add Supplier Order Interface

User has to select Supplier Name, Order Date, Category and Item Name. Then it shows Gauge, Shape, Width, Colour relevant to the product if it is provided. Available quantity and unit price show according to the product. User has to type order quantity and add it to the supplier order table by clicking add to table button.

Figure 3.19 Shows User Interface for submit supplier order

Item Name	Shape	Gauge	Width	Qty	Unit Price
Roofing	Curve	0.47MM	48	200	80.00
Roofing	Half Curve	0.32mm	36	100	60.00

Proceed Supplier Order

Figure 3-19 Add Supplier Order Interface

User Add all the Product Items to the Supplier Table Proceed Supplier Order by Submitting Supplier Order Table.

3.7 Module Planning and Design

This system is designed to Satisfy and fulfill the requirements of Helix Engineering. It will assist the user to carry out their tasks effectively, efficiently and easily by reducing the manual human effort. And also by generating reports system will help the management to take effectively. System has divide into modules for easier development.

3.8 Alternative Solution for the system

3.8.1 Purchase commercial stand-alone software and web site separately.

It's a quick and easy solution. But this software may not fulfill all the requirement of the client and unnecessary features can be contained. Separate internal system and web site may have to be occurred many difficulties in to working together.

3.8.2 Free software package

It is a Cost effective solution. Selected company products have complex attributes. Readymade software may not be able to handle products verities.

3.8.3 Use a Web based system

Client needed a web based system to keep data updated and place online orders.

Web based systems are platform independent.

Customer can view products, place online orders, send inquiries anytime, anywhere.

Nowadays online business (e-business) is very popular so it's very important to have a web based system to compete with other competitors.

3.9 Design architecture

MVC is a programming design pattern .In MVC different portions of code are responsible for representing

M - Model

V – View

C – Controller in some application.

In Controller the data is directing to where it needs to go. And also figure out which view it needs to load up, and interacting with the appropriate models.

In Web application View represents what those users interact with (buttons, Forms, information etc...). The controller calls up the viewer after interacting with model.

The place that Data from the controller and view is passed into, out of and manipulated is Model.

Figure 3.20 Shows Diagram for MVC Architecture

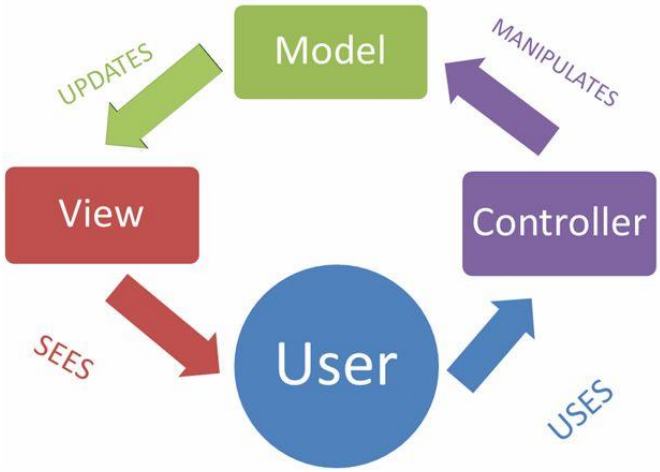


Figure 3-20 MVC [8]

CHAPTER 4. IMPLEMENTATION

4.1 Introduction

System Implementation is the phase that converts designs into working modules. Model by model System transform into an executable program as Identified in Analysis phase and design Phase. Proposed system has been implemented with modern system Implementation tools in order to fulfill requirements of the Helix Engineering

4.2 Implementation Environment

System Implementation Environment can be categorized into 2 main categories.

Table 4.1 shows Hardware and Software Requirements for the System

Hardware	**Software**
Intel(R) core(TM) i3 CPU @ 2.27Ghz	Microsoft Windows 8.1 Pro
4 GB RAM	PHP
500 GB Hard Disk	Apache
	MySQL I version 10.1.13
	Net beans

Table 4-1 Implementation Environment

4.3 System Development tools, Technologies and Hardware

Technologies

PHP

Server side scripting language used to develop the system.

HTML

Use as Basic web language to Design the structure of web pages.

CSS

To enrich html web pages with styles.

JavaScript

Use as client side scripting language.

Jason

Light weight data interchange format.

Supported Software & Development Tools

- XAAMP - Web server solution
- MySQL I - (MySQL Improved) is a relational database driver used in the PHP scripting language to provide an interface with MySQL databases.[9]
- MySQL Work bench 6.3 - For diagram designing
- Ajax - With Ajax, Web applications can send data to and retrieve from a server asynchronously (in the background) without interfering with the display and behavior of the existing page. [10]
- KompoZer version 0.7.10

Google chrome & Mozilla Firefox

- TCPDF
- Photoshop CS5

4.4 Network Implementation

Figure 4.1 Shows Network Implementation Structure diagram

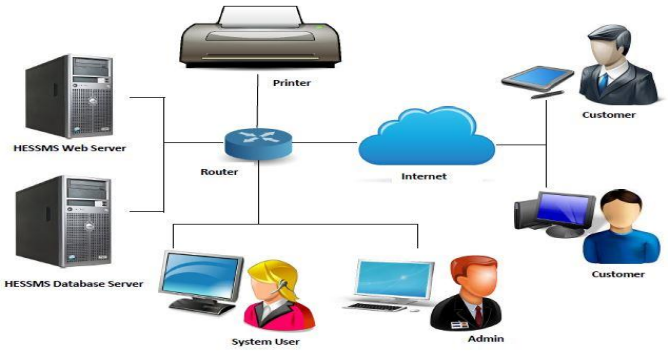


Figure 4-1 Network Implementation

As in the above figure the internal staff can access the system via web server and external customers can access it via telecommunication by Login to the System.

4.5 Code and module structure

MVC architecture is used to develop the system. It divides a given system into tree interconnected parts. Folder structure of the SSMSHE is shown below in *figure 4.2, 4.3*

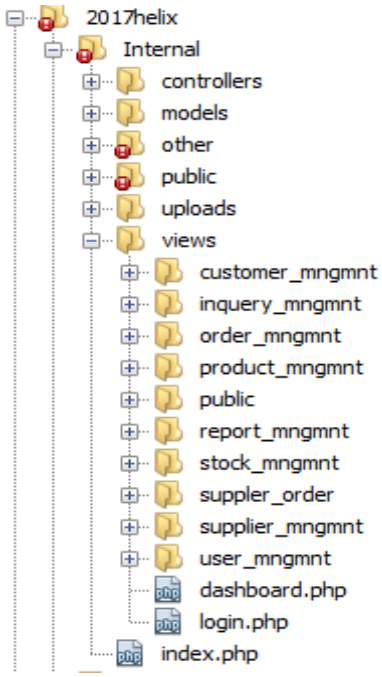


Figure 4-2 Folder structure for internal system

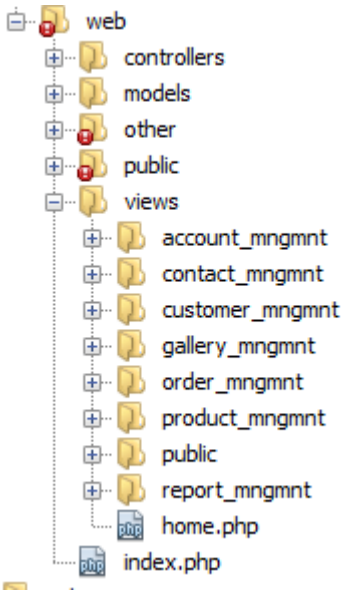


Figure 4-3 Folder structure for Web site

4.6 Major Code Segments

Major code modules developed in the system are given below with a brief functionality description.

4.6.1 Database Connection Page

Every computer system (Web based system or standalone) deals with a Database. When something adds, Edit, Deactivate, System is connected with the Database. Sometimes information fetch in to the interfaces from the Database. mysqli() function represent the connection between PHP and Database. Its help to Passing parameters ($hostname, $user, $password, $db) that use to establish the Database connection.

Figure 4.4 Shows Code Segment for Database Connection

```php
<?php
//This php class establish the database connection
class Model {

    public function __construct() {
        $hostname = "localhost";
        $user = "root";
        $password = "";
        $db = "helixeng";

        $this->db = new mysqli($hostname, $user, $password, $db);

        $cntrl_instnce = Controller::get_instence();
        $cntrl_instnce->db = $this->db;
    }

}

?>
```

Figure 4-4 Database Connection Page

4.6.2 Session Handling Page

Following code segment connect all the required files to catch the user login information for the continuing process and also start the session.

Figure 4.5 Shows Code Segment for Session handling

```php
function __construct() {
    if (!isset($_SESSION)) {
        session_start();
    }
}

public function set_userdata($data) {
    foreach ($data as $key => $value) {
        $_SESSION[$key] = $value;
    }
}

public function get_userdata($key) {
    return isset($_SESSION[$key]) ? $_SESSION[$key] : '';
}
```

Figure 4-5 Session Handling Page

Set session Variable values

This code snippet *Figure 4.6* shows how data set into the session.

```
function set_session_data($user_data) {
    $user_array = array(
        'user_name' => $user_data->user_name,
        'emp_id' => $user_data->emp_id,
        'role_name' => $user_data->role_name,
        'emp_image' => $user_data->emp_image,
        'is_login' => TRUE
    );
    $this->session->set_userdata($user_array);
}
```

Figure 4-6 Set Session

Search Employee

Code snippet shown in *Figure 4.7* used for search employee by user name and NIC.

```
function get_user_by_ref($data) {
    $sql = 'select * from ' . EMPLOYEE;
    $where = '';
    if (isset($data['username']) && $data['username'] != '') {
        $where .='  emp_fname LIKE  "%' . $data['username'] . '%" ';
    }
    if (isset($data['nic']) && $data['nic'] != '') {
        $where .= ($where != '' ? ' AND ' . ' emp_nic LIKE  "%'
                . $data['nic'] . '%"' : ' emp_nic LIKE  "%' . $data['nic'] . '%" ');
    }

    $sql = $sql . ($where != '' ? ' WHERE ' . $where : '');
    $result = mysqli_query($this->db, $sql);
    $users = array();
    while ($row = mysqli_fetch_assoc($result)) {
        $users[] = $row;
    }

    return $users;
}
```

Figure 4-7 Search User

4.6.3 User Level Management

Figure 4.8 Shows Code Segment for fetch relevant data to show navigations according to different user levels.

```
function load_navigation() {
    $user_rl = $this->session->get_userdata('role_name');
    $sql = 'select * from ' . NAV_OPTNS . ' n JOIN ' . USR_RL_NAV_OPTNS .
            ' un  ON un.nav_code=n.nav_code where n.is_parent=1 and '
            . 'un.role_id= "' . $user_rl . '" order by un.list_order ';
    $result = mysqli_query($this->db, $sql);
    $nav_list = array();
    $i = 0;
    while ($row = mysqli_fetch_assoc($result)) {
        $nav_list[$i] = $row;
        $sub_option = array();
        $sql2 = 'select * from ' . NAV_OPTNS . ' n JOIN ' . USR_RL_NAV_OPTNS .
                ' un  ON un.nav_code=n.nav_code where  n.show_blw="' . $row['nav_code'] . '"  and'
                . ' un.role_id= "' . $user_rl . '"  order by un.list_order  ';
        $result2 = mysqli_query($this->db, $sql2);
        while ($row2 = mysqli_fetch_assoc($result2)) {
            $sub_option[] = $row2;
        }$nav_list[$i++]['sub_options'] = $sub_option;
    }

    return $nav_list;
}
```

Figure 4-8 User Level

Create dashboard navigation

Figure 4.11 Shows Code Segment for Create the Dashboard Navigation using the Fetched data from the database.

```
    <div class="col-lg-12">
        <!--                    User Navigation-->
<?php foreach ($nav_options as $option): ?>
            <div class="col-lg-2 col-md-2">
                <a href="<?php echo base_url() . 'index.php/' . $option['page_id'] ?>">
                    <img src="<?php echo base_url() . $option['nav_image']; ?>"/><br>
    <?php echo $option['nav_name']; ?></a>
            </div>
                <?php endforeach; ?>


    </div>
```

Figure 4-9 Dashboard Navigation

4.6.4 Product Management Page

Generate Unit Price

The code snippet *Figure 4.10* below generate Unit price table after adding all Product Attributes.

```
function generate_price_tbl() {
    table_keys = [];
    price_data = []
    $('.prce_tbl thead').empty()
    $('.prce_tbl tbody').empty()
    var th_tr = $('<tr>')
    $.each($('.attri_tbl tbody tr'), function(k, v) {
        table_keys.push($(v).find('td:nth-child(1) input').val());
        $(th_tr).append($('<th>', {text: $(v).find('td:nth-child(1) input').val()}))
    })
    $(th_tr).append($('<th>', {text: 'Unit Price'}))
    $(th_tr).append($('<th>', {text: 'Pre-Order Level'}))
    $('.prce_tbl thead').append(th_tr)
    /*...3 lines */
    console.log(table_keys)
    if (table_keys[0]) {
        var count = 0;
        $.each(attri_data[table_keys[0]], function(k, v) {...35 lines })
        $.each(price_data, function(k, v) {...20 lines })
    }
}
```

Figure 4-10 Generate Unit Price

Remove a gauge

If User deletes a gauge added gauge value after generating Unit Price table *Figure 4.11*

Code segment remove that gauge value and re generate the Unit Price table.

```
$('.gauge_tbl').on('click', '.g_cls', function() {
    var tr = $(this).closest('tr');
    var g_key = $(tr).find('td:first-child input').val()
    var key = -1;
    $.each(attri_data['Gauge'], function(k, v) {
        if (v.key == g_key) {
            key = k
        }
    });
    attri_data['Gauge'].splice(key, 1);
    $(tr).remove()
    if (attri_data['Gauge'] == 0) {

        $.each($('.attri_tbl input'), function(k, v) {
            if ($(v).val() == 'Gauge') {
                $(v).parents('tr').remove()
                return false;
            }
        })
    }
    generate_price_tbl()
})
```

Figure 4-11 Remove Gauge

4.6.5 Supplier Order Management

Get Unit Price

Figure 4.12 Code Segment given below check the attribute combination and get the Unit price for selected Product.

```
function product_unit_price($data) {
    $sql = 'select atribute from ' . PRCE_ATTR . ' where pro_id= "' . $data['id'] . '"';
    $res = mysqli_query($this->db, $sql);
    $attrs = array();
    while ($row = mysqli_fetch_assoc($res)) {
        $attrs[] = $row['atribute'];
    }
    $where = '';
    $unit_prce_sql = '';
    $res = null;
    if (count($attrs) > 0) {
        $unit_prce_sql = 'select * from ' . PRDCT_DTLS . ' where ';
        foreach ($attrs as $attri) {
            if ($where != '') {
                $where.=' and ';
            }
            $where.= strtolower($attri) . ' = "' . $data[strtolower($attri)] . '" ';
        }
        $unit_prce_sql = $unit_prce_sql . $where . '  and product_id = "' . $data['id'] . '" ';
        $res = mysqli_query($this->db, $unit_prce_sql);
    }


    return $res != null ? mysqli_fetch_object($res) : 0;
}
```

Figure 4-12 Get Unit price

Update Product Item Quantity

Figure 4.13 Shows code segment Update the Stock product Item Quantities.

```
function update_qty($data) {
    $is_sucess = false;
    $sql = "select * from " . PRO_QTY . '  where  gauge_id="' . $data['gauge_id'] . '"  and width_id="' . $data['width_id']
    $result = mysqli_query($this->db, $sql);
    $res = mysqli_fetch_object($result);
    if (count($res) > 0) {
        $update_sql = ' update  ' . PRO_QTY . ' set qty=qty+ ?  where  gauge_id=? and width_id=? and shape_id=? and pro_id=
        $stmt = mysqli_prepare($this->db, $update_sql);
        $bind_res = mysqli_stmt_bind_param($stmt, 'issss', $data['qty'], $data['gauge_id'], $data['width_id'], $data['shape_
    } else {
        $update_sql = " INSERT INTO   " . PRO_QTY . "  (pro_id,gauge_id,width_id,shape_id,color_id,qty) values(?,?,?,?,?,?)"
        $stmt = mysqli_prepare($this->db, $update_sql);
        $color = "";
        $bind_res = mysqli_stmt_bind_param($stmt, 'ssssi', $data['item_id'], $data['gauge_id'], $data['width_id'], $data['s
    }

    if ($bind_res) {
        $is_sucess = mysqli_stmt_execute($stmt);
        mysqli_stmt_reset($stmt);
        mysqli_stmt_close($stmt);
    }

    return $is_sucess;
}
```

Figure 4-13 Update Product item Quantity code segment

Available Quantity

Figure 4.14 code snippet gets the available quantity for selected product.

```
function get_avlble_qty($data) {
    $sql = 'select qty from ' . PRO_QTY . ' ';
    $where = '';
    if (isset($data['shape'])) {
        $where = ' shape_id = "' . $data['shape'] . '" ';
    }

    if (isset($data['gauge'])) {
        if ($where != '') {
            $where = $where . ' and ';
        }
        $where = $where . ' gauge_id = "' . $data['gauge'] . '" ';
    }

    if (isset($data['width'])) {
        if ($where != '') {
            $where = $where . ' and ';
        }
        $where = $where . ' width_id = "' . $data['width'] . '" ';
    }
    $sql = $where != '' ? $sql . ' where ' . $where : $sql;
    $res = mysqli_query($this->db, $sql);
    return mysqli_fetch_object($res);
}
```

Figure 4-14 Get unit Price

Mysqli Prepare Statement

The code segment shown *Figure 4.15* use to Insert Supplier Order .Mysqli prepares statement used as a security option to prevent sql injections.

```
function insert_supplier_order($data) {
    $is_success = false;
    mysqli_autocommit($this->db, false);
    $seq_no = generate_seq_no(SUP_ORDR, 'seq_no');
    $order_id = generate_id('SO', SUP_ORDR, 'seq_no');
    $sql = 'INSERT INTO ' . SUP_ORDR . ' (order_id,supplier_id,order_date,seq_no) values (?,?,?,?)';
    $stmt = mysqli_prepare($this->db, $sql);

    mysqli_stmt_bind_param($stmt, 'sssi', $order_id, $data['supplier_id'], $data['order_date'], $seq_no);
/       "' . $order_id . '","' . $data['supplier_id'] . '","' . $data['order_date'] . '",' . $seq_no . '
    $sup_ordr = mysqli_execute($stmt) > 0;
    mysqli_stmt_close($stmt);
    if ($sup_ordr) {
        $data['order_id'] = $order_id;
        $is_success = $this->insert_suplier_order_dtls($data);
    }

    if ($is_success) {
        mysqli_commit($this->db);
    } else {
        mysqli_rollback($this->db);
    }
    return $is_success;
}
```

Figure 4-15 MySQLi Prepare Statement

4.7 Security

Since system deals with external Users' personal information and payment details it should be maintain with a secure method.

4.7.1 SHA1

Sha1 was used as encryption Method over MDS, because Sha1 produces more bit harsh values (160) than MD5 produces (128).

4.7.2 Session Handling

These enable users to build more customize applications and increase the appeal of the system. Support in php consists of a way to preserve data across subsequence accesses.

4.7.3 Mysqli Prepare statement.

The prepared statement execution consists of two stages: prepare and execute. At the prepare stage a statement template is sent to the database server. The server performs a syntax check and initializes server internal resources for later use. The MySQL server supports using anonymous, positional placeholder with '?'[9].

4.8 Re-Used Components

Following re – Usable components have been used in the system to add more attractiveness and efficient to the system

- **CSS re-used components**

Style sheet language Used to make styles to the Interfaces.

- **JavaScript Re-Used components**

Date Picker has been used when designing the date selection input

Pagination has been used when managing data in the system

Image Preview has been used to View Selected image Preview.

Highcharts have been used to View reports as charts.

CHAPTER 5. EVALUATION

5.1 Introduction

Evaluation is a systematic determination of a subject's merit, worth and significance, using criteria governed by a set of standards. It can assist an organization, program, project or any other intervention or initiative to assess any aim, realizable concept/proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and objectives and results of any such action that has been completed. The primary purpose of evaluation, in addition to gaining insight into prior or existing initiatives, is to enable reflection and assist in the identification of future change [11].

5.2 System Test Plan

Planning test cases are very important and necessary part in system development process. It gives ability to test functionalities of the system, identify errors and weaknesses of the system and correct them.

5.3 System Test Cases

Test case is a set of test inputs, execution conditions, and expected results developed for a particular objective, such as to exercise a particular program path or to verify compliance with a specific requirement [14].

5.3.1 Test cases for Product Management Module

Table 5-2 Shows Test Cases for Product Management

Test Number	Test Description	Steps to test	Expected Results
1	Validate Add new Gauge	Enter correct Details for all the fields.	Redirect to the Gauge list Page and Display “Successfully Added” Message.
2	Validate Add new Gauge	Submit Form keeping all fields empty.	Display Error Messages for required fields.

3	Validate Add new Colour	Enter correct Details for all the fields.	Redirect to the Colour list Page and Display “Successfully inserted” Message.
4	Validate Add new Colour	Submit Form keeping all fields empty.	Display Error Messages for required fields.
5	Validate Add new Product	Enter correct Details for all the fields.	Redirect to the Product list Page and Display “Successfully Added” Message.
6	Validate Add new Product	Submit form keeping all the fields empty	Display Error Messages for required fields.
7	Validate Add new Product	Try to upload not image file as product image.	Display Error Messages “Invalid file type. “ For required fields.
8	Validate Add new Product	Try to Add Same Gauge twice.	Display Error Message
9	Validate Add new Product	Try to Add Same Width twice.	Display Error Message
10	Validate Add new Product	Try to Add Same shape name twice.	Display “Already Exists”.
11	Validate Add new Product	Try to Add Same Price Attribute twice.	Display Error Message
12	Validate Add new Product	Try to Add a Price Attribute values not added.	Display Error Message

12	Validate Add new Product	Delete a Gauge value After generating Unit Price table	Re-Generate Unit Price Table.
14	Validate Add new Product	Delete a Shape value After generating Unit Price table	Re-Generate Unit Price Table
15	Validate Add new Product	Delete a Width value After generating Unit Price table	Re-Generate Unit Price Table
16	Validate Add new Product	Delete a Price Attribute value After generating Unit Price table	Re-Generate Unit Price Table

Table 5-1 Test Cases for Product Management Module

5.3.2 Test cases for Order Management Module

Table 5-3 Shows Test Cases for Order Management

Test Number	Test Description	Steps to test	Expected Results
1	Validate Add New Product to Order	Enter correct Details for all the fields.	Add New Product to the Cart Table and Empty Add order form
2	Validate Add New Product to Order	Submit Form keeping all fields empty.	Display Error Messages for required fields.
3	Validate Add New Accessory to Order	Enter correct Details for all the fields.	Add New Accessory to the Cart Table and Empty Add order form

4	Validate Add New Accessory to Order	Submit Form keeping all fields empty.	Display Error Messages for required fields.
5	Validate Add New Product to Order	Change Product Item before adding to cart	Change Product attributes values and Unit Price Field values.
6	Validate Add New Accessory to Order	Change Accessory Item before adding to cart	Change Accessory attributes values and Unit Price Field values.
7	Validate login to the system as customer	Enter correct Details for user name and Password.	Redirect to the Order Summary Page.
8	Enter correct Details for all the fields.	Submit Form keeping all fields empty.	Show Error message “ Please Enter Username” , “ Please Enter Password”,

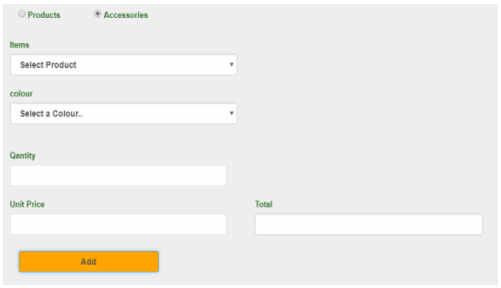
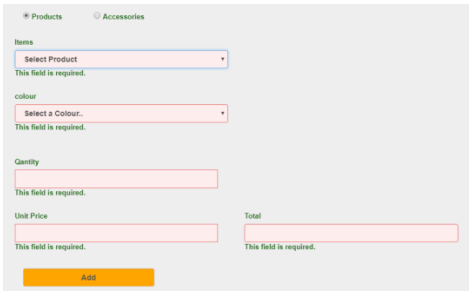
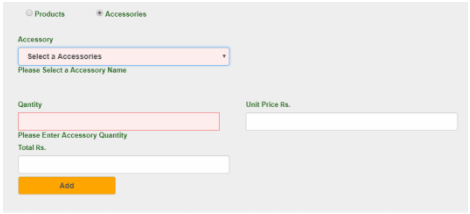
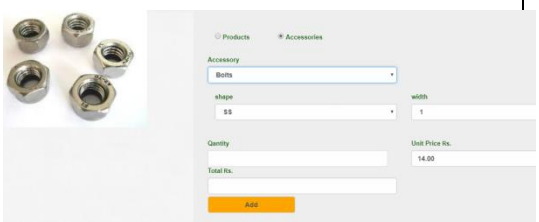
Table 5-2 Test cases for Order Management Module

5.4 Test results

Test Result for Order Management Model

Table 5-4 shows test result for order management model

Test Number	Test Description	Steps to test	Expected Results	

1	Validate Add New Product to Order	Enter correct Details for all the fields.		✓
2	Validate Add New Product to Order	Submit Form keeping all fields empty.		✓
3	Validate Add New Accessory to Order	Enter correct Details for all the fields and Submit Form.	Add New Accessory to the Cart Table and Empty Add order form. 	✓
4	Validate Add New Accessory to Order	Submit Form keeping all fields empty.		✓
5	Validate Add New Product to Order	Change Product Item before adding to cart	Change Product attributes values and Unit Price Field values. 	✓

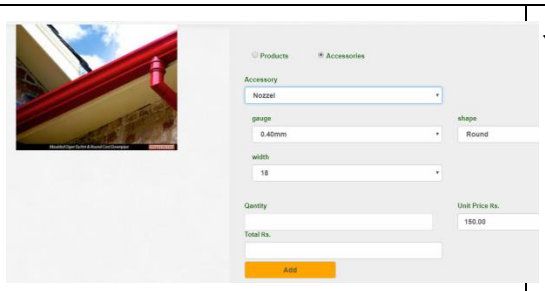
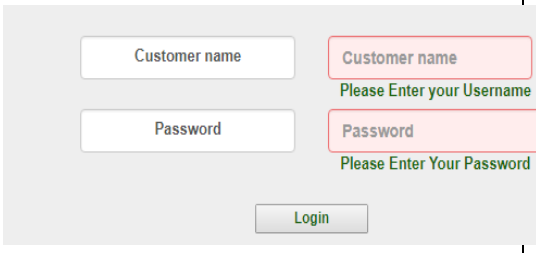
6	Validate Add New Accessory to Order	Change Accessory Item before adding to cart		✓
7	Validate login to the system as customer	Enter correct Details for user name and Password.	Redirect to the Order Summary Page.	✓
8	Enter correct Details for all the fields.	Submit Form keeping all fields empty.	Show Error message " Please Enter Username" , " Please Enter Password" 	✓

Table 5-3 Test result for order management model

User Acceptance Testing

Higher Management Member such as Proprietor, Mangers and Shop keeper with external parties are only personal the system would interact with.

At the analyzing stage, it was identified that the co-workers have poor knowledge about using computer technology (Company Observation technique has helped to get that information).Their own staff members of external parties a considerable knowledge about the technology is with the client.

Therefore, interaction is only with the higher management levels and external parties. It was informed that external parties could not participate at the testing session and the testing criteria had been informed to the proprietor.

The overall system including external parties' criteria had been tested by the proprietor; other workers of the second level management and shop keeper for third level management of the company were tested and gave their feedback.

Feedbacks were collected by using set of Questions.

Summary of the Feed Back is given below in figure 5.1

Figure 5-1 Summary of feedback

CHAPTER 6. CONCLUSION

6.1 Introduction

Helix engineering is a leading quality roofing related accessory manufacturing company in Wadduwa area. As a company which interacts with clients, currently they have a manual system to handle their day today activities. This computer based system with web site has been developed to face competition that is experienced in the business field.

Therefore to expand their business position and to enhance customer relationship to gain more stable position in construction field this web site and computer based system is a very good solution.

In this Project, client requirement are very important and products have many attribute values. System allows customers to add online orders and feedbacks. The developed Web site provide facility to the company to show their products constructions and contact details to the system users by providing connection to the social network system to enhance the customer relationships.

With all these features system has made a valuable business solution for Helix Engineering Wadduwa to fulfill their Objectives.

6.2 Lessons learnt

As a student taking BIT degree program from UCSC, this was a great opportunity for me to apply the previously learnt knowledge into a working system. The System domain area was considerably large and Product varieties are very complex, therefore it helped me to gain experience in many business techniques, Analyzing and understand how to connect those business process into a computerized system.

I was able to improve my communication skills by communicating with external parties. When Developing the System using php, MySQL and Java Script I could improve my knowledge and skills to collect new techniques that can be used to do our work effectively.

Apart from that I could learn to write reports according to the recognized standards and to present reports to interested parties who wish to read.

6.3 Critical evaluation of the project development

Project development was started with requirement gathering and analyzing since the client is currently having a manual system, requirement gathering and customer satisfaction was a hard task to accomplish. Due to the unfamiliarity of the problem domain, this stage took a long period of time in the project life cycle.

Use case diagrams, ER diagrams, Class diagrams were used to analyze the system. Database was normalized according to the requirements and interfaces were designed according to user preference.

Increasing the efficiency and effectiveness of the performance was the primary objective. In this Project, client requirement are very important and products have many attribute values. To achieve the goal, Product items were categorized into three types and let user to select attributes (gauge, width, shape, colour), attribute values for each product items.

Testing was done throughout the coding part and as well as unit based (unit testing) and finally, based out the entire system (system testing) to make sure the reliability of the functions.

With all these features system has made a valuable business solution for Helix Engineering Wadduwa to fulfill their Objectives.

6.4 Future Improvements

Developing a Computer based system for an Expanding Company is a huge task. Further improvements for the HESSMS are as follow,

- SMS Alert facility

Users can get relevant information or alerts without log in to the system

- Add more reports

System can generate more reports according to client's current needs. It can enhance featured by adding charts.

- Add customize options for products.

User can add more features to the Products.

- Manage New Products - Users can Expand Product variations.

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APENDIX A : SYSTEM DOCUMENTATION

This documentation explains how to install this software system. You can follow this documentation as a help of your installation.

1st step

In this step explains hardware and software environment which need to be installed.

Hardware

Table A-1 and Table A-1 Shows Hardware and Software Requirement for System

Hardware	**Minimum requirement**
Processor	2.2Hz Intel Processor
Memory	1GB
Hard Disk	40GB
Display	1024X 768 resolution monitor
Printer	Inkjet / LaserJet / Dot-matrix Printer
Internet Connection	512Mbps speed

Table A-1 Hardware Requirements

Software requirements

Software	**Minimum requirement**
Operating System	Windows 7 /8/10

XAMPP	Apache/2.4.18 (Win32) OpenSSL/1.0.2e PHP/7.0.6 MySQL 5.5 or newer
Web Browser	Google chrome or Mozilla Firefox
PDF Converter	

Table A-2 Software requirements

2nd step

Installing XAMPP

Download and install XAMPP for windows (version mansion in the table) from https://www.apachefriends.org/download.html. *Figure A-1* shows home page of apache web site. Give installation path to C:\xampp folder of the computer.

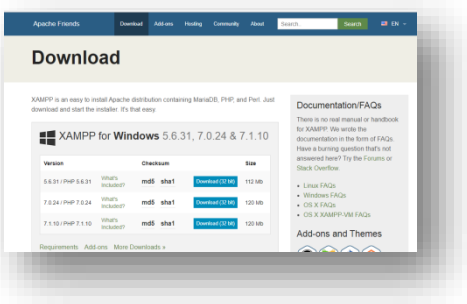


Figure A-1 XAMPP Web site

Installing Web Browser

Install firefox web browser from https://www.mozilla.org/en-US/firefox/new

Home page of Mozilla.org is shown in figure A-2.

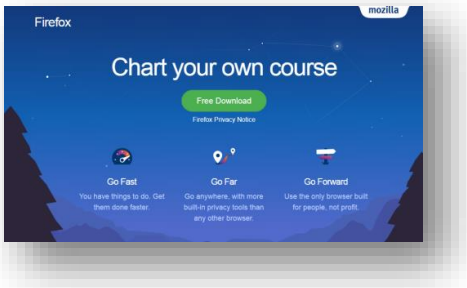


Figure A-2 Mozilla Firefox Web Site

OR

Install Google chrome web browser from

https://www.google.com/chrome/browser/features.html shown in figure A-3

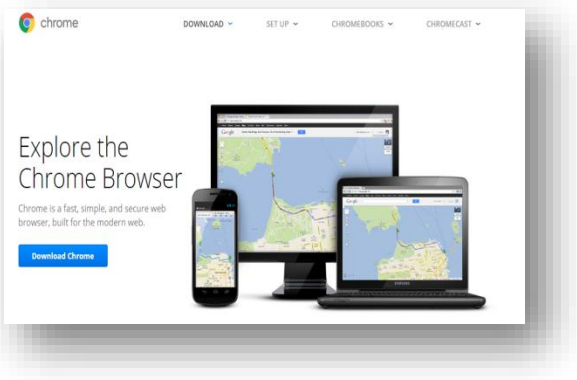


Figure A-3Gooogle Chrome Web Site

3rd Step

File extraction

Open the CD and copy Helix Engineering folder and paste it to the directory path "C:\xampp\htdocs"

4th Step

Database Installation

Open a web Browser and type http://localhost/phpmyadmin/ in the address bar Enter the Username and Password (If you set username and password.).

Create Empty Database

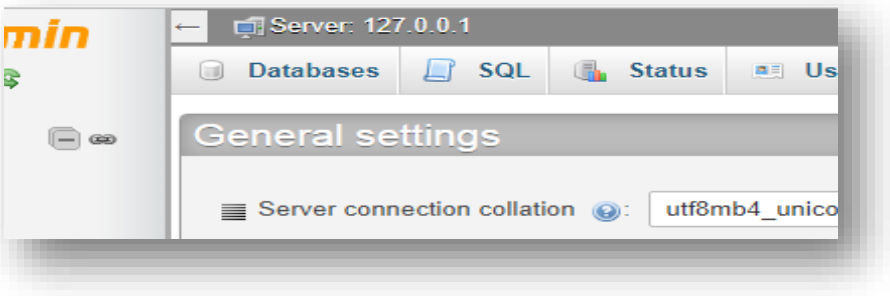


Figure A-4 Create Database

Create new empty database using Database tab shown in figure A-4

Save its name as HelixEng and navigate import tab (shown in figure A-5) and click choose file button (shown in figure A-6).

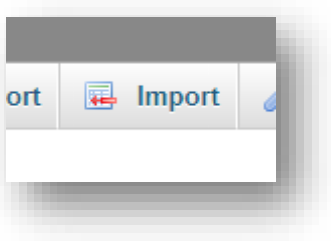


Figure A-5 Import icon

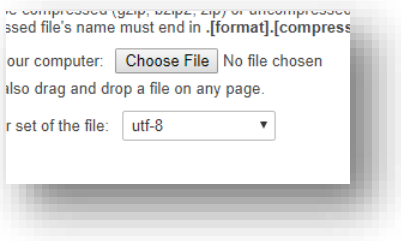


Figure A-6 Choose file Button

Then browse the CD and select the HelixEng.sql file inside the 'DATABASE' folder. Then press Go button located in the bottom of the page.

5th Step

Launching the system

Verify the XAMPP is running,

Go to the C:\xampp\ and open control panel. Verify whether Apache, MySQL is running.

Open a Web browser and type the URL http://localhost/2017helix/Internal/ in the address bar and enter.

APENDIX B : DESIGN DOCUMENTATION

Entity Relationship Diagram section for Order Processing

Figure B-1 shows ER diagram for section for order processing

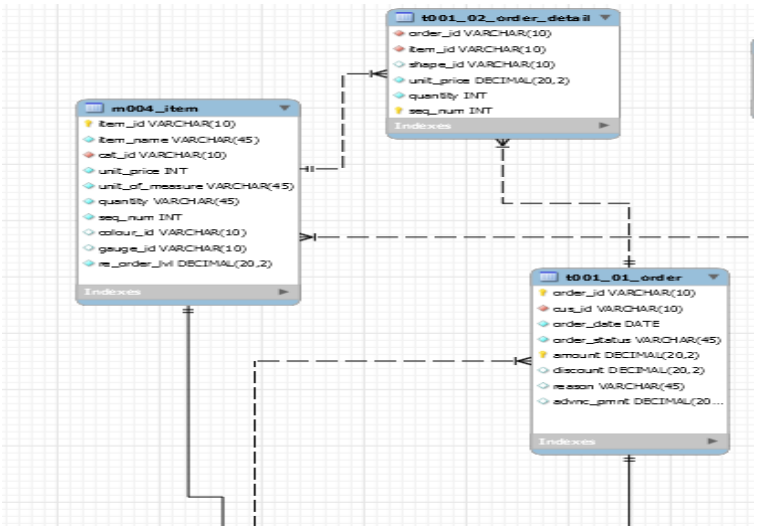


Figure B-1 Entity Relationship diagram section for order Processing

Use case diagram for User login

Figure B-2 shows use case diagram for user login

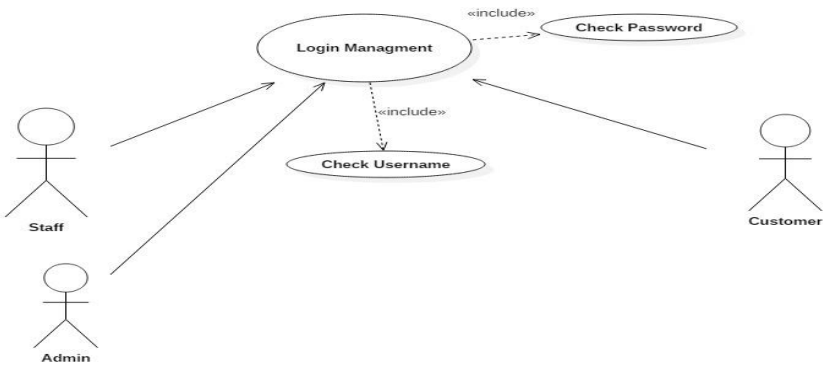


Figure B-2 Use case diagram for user login

APENDIX C : USER DOCUMENTATION

This document will help to privilege users to Access to the system and Navigate within the system. Eligibility to access the system is available Administrator, Web Administrator, Manager and staff. Different user levels are available to each User.

Login Page

Open the Web Browser that configured in the installation Type the URL http://localhost/2017helix/Internal/ in the address bar and Enter. Then User can see the Login Page shown in *figure C-1*. Enter User Name and Password. Page will direct to the privileged Dashboard Page.

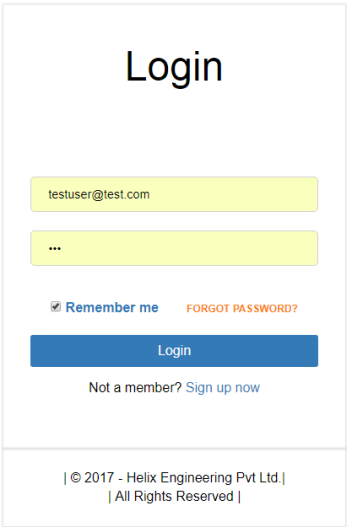


Figure C-1 Login Interface

Log Out

Figure C-2 Logout Button

Click on the Log out Button on the Right top Conner to log out from the Session .Log out button is shown in *figure C-2.*

Data Manipulation in the tables

Search box: Data or set of data wanted by the user can be found with the help of the search box. Type the relevant search word or number in search box as mention inside the box (shown in *figure C-3*) .

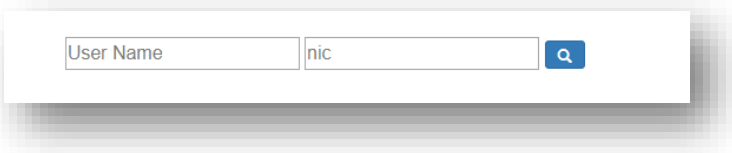


Figure C-3 Search

Show number of Entries

User can manage how many records should appear in the table at a time by selecting from drop down menu. . Shown in *figure C-4*

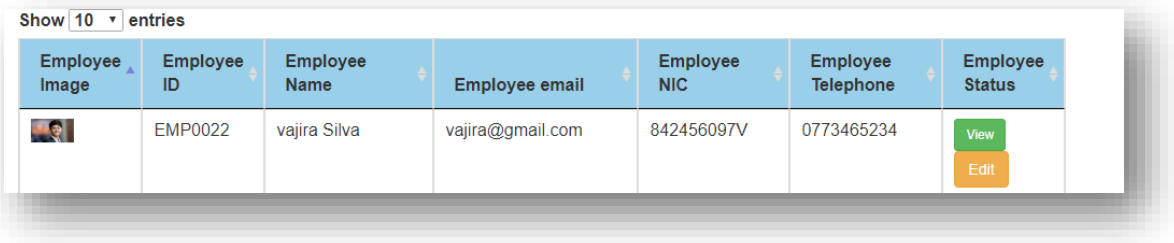


Figure C-4 User List

If there are more records than selected value, navigate next set of pages. As Shown in figure C-5

Figure C-5 Navigation

Using which located at the bottom right Conner of the Table.

View Details

Additional Information relevant to the selected record can be viewed with the help of this button shown in *figure C-6*.

Figure C-6View Button

Update

User can view an update interface with the help of this button shown in *figure C-7*.

Figure C-7 Edit Button

Activate /deactivate

Buttons shown in *figure C-8* indicate Status for a particular item.

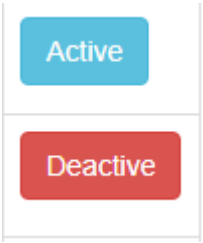


Figure C-8 Active Deactivate

Calendar

Particular date needed to enter by user can be easily select from the calendar object shown in *figure C-9.*

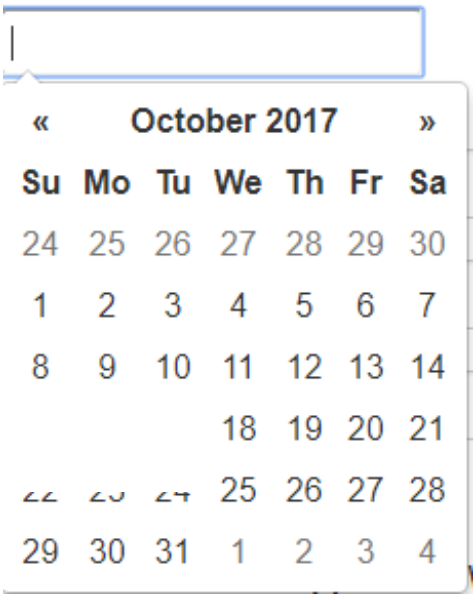


Figure C-9 Calendar

Add new colour

Using the interface shown in *figure C-10* user can enter a Product Colour Name and suitable image file as a product image.

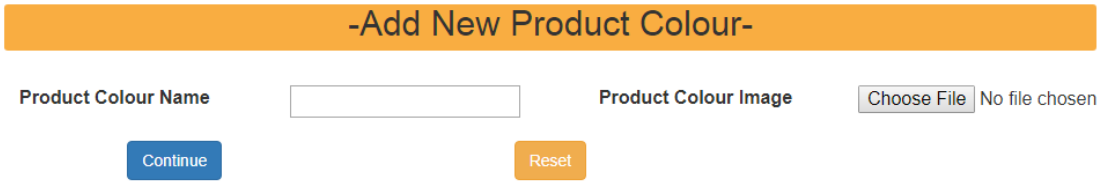


Figure C-10 Add Product Colour

Add new gauge

Using the interface shown in *figure C-11* user can enter a Product gauge.

Figure C-11 Add new gauge

Edit Gauge

Using the interface shown in *figure C-12* user can edit Gauge value.

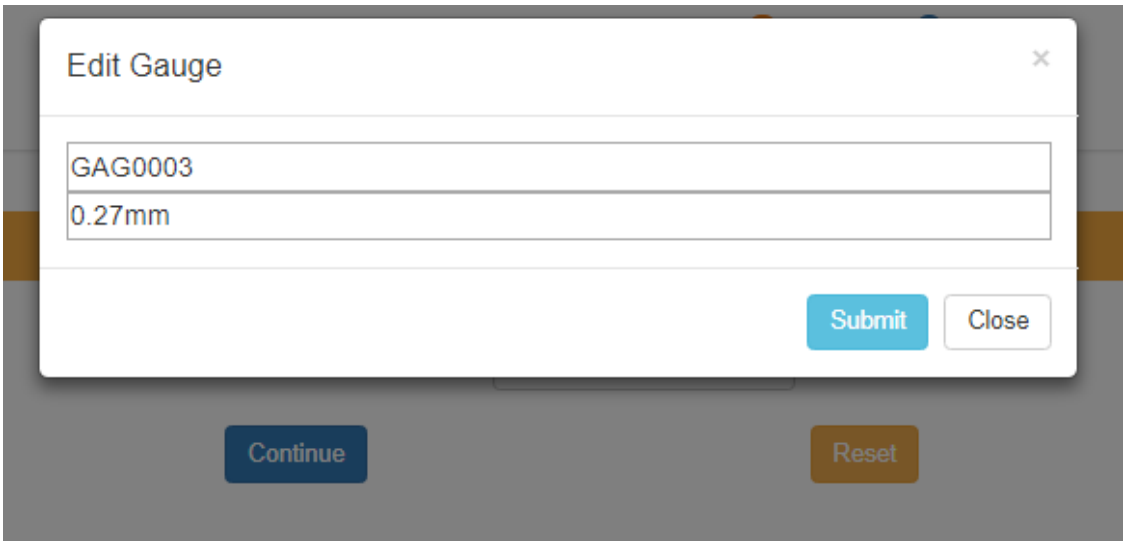


Figure C-12 Edit Gauge

View Product gauge List

Figure C-13 Shows list of shapes that add in the product management Page. Users can search products by shape name.

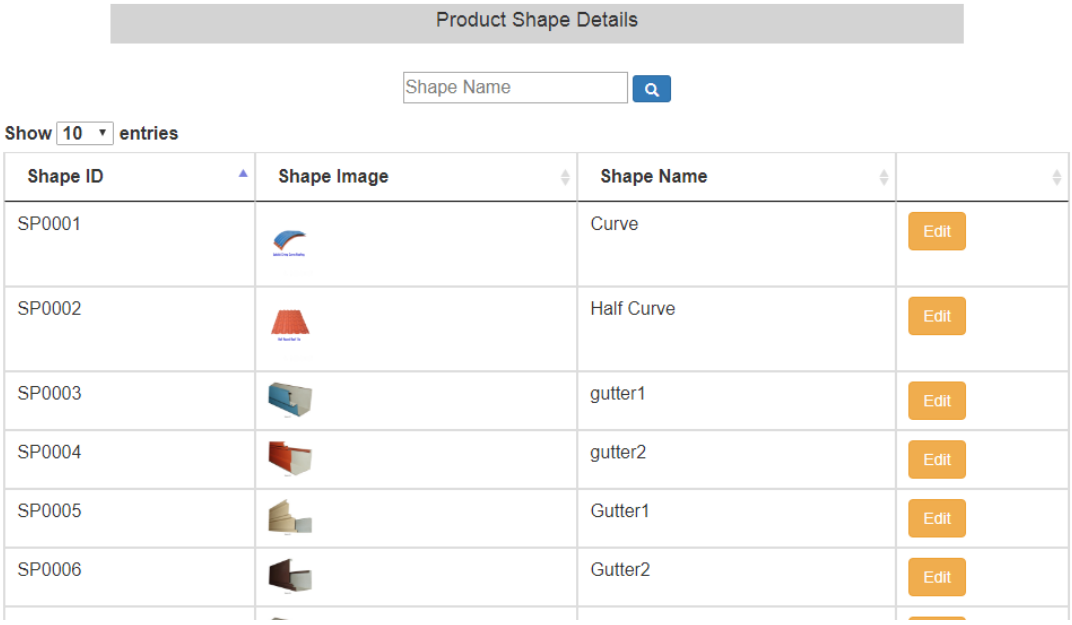


Figure C-13 Shapes List

Add new Product Interface

Path: Product Management ⇨ Add product

Figure C-14 shows interface to add new product name, image and category

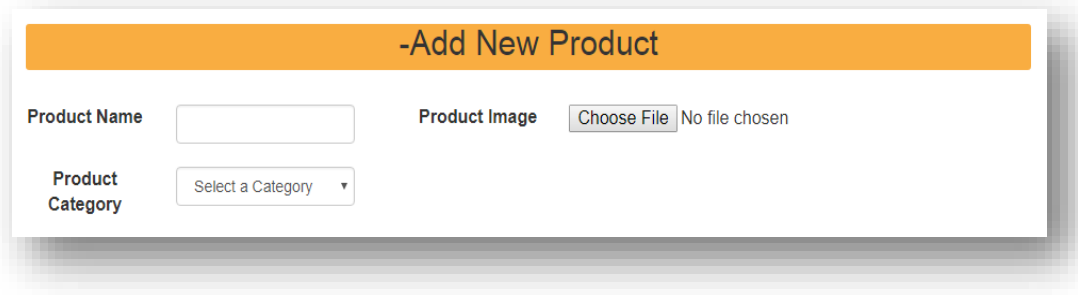


Figure C-14 Add New Product

First Enter Product Name Select an image file as a product image then select the product category from the drop down list.

Then Select Gauge and click add gauge button as shown in *figure C-15*.

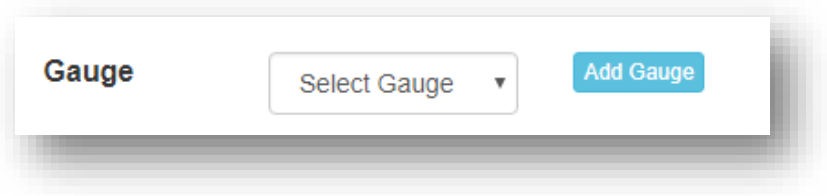


Figure C-15 Select Gauge

User can remove added gauge click on remove button using the interface shown in *figure C-16*.

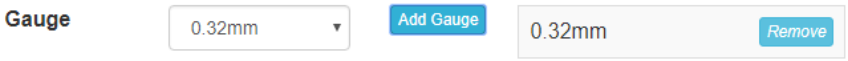


Figure C-16 Remove gauge

If Product has shapes type the number of shapes in the box shown in *figure C-17*.

Figure C-17 Number of shape

Then Type Shape Name in the text box and select an image as shape image from the appeared interface as shown in *figure C-18*. User can remove added shape by clicking on button.

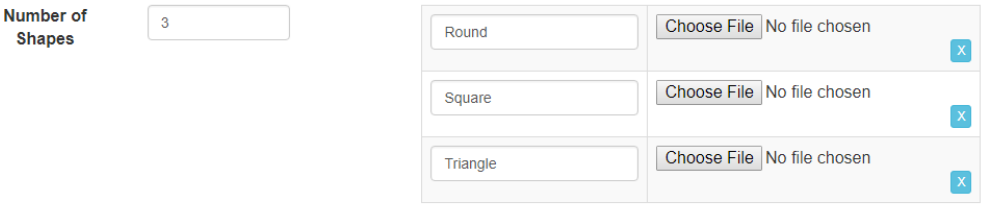


Figure C-18 Insert Shape

If Product has Width/Widths Select the width and click Add Width button to add a width using interface shown in *figure C-19*.

Figure C-19 Select Add Width

User can remove added Width by clicking on button as shown in *figure C-20*.

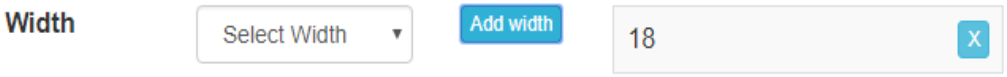


Figure C-20 Insert Width

Select a price attribute from the list and click on Add attribute button using the interface shown in *figure C-21*. User can't add an attribute that not added from above and same attribute twice.

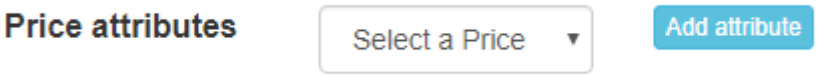


Figure C-21 Select Price Attributes

User can remove added Attribute by clicking on button as shown in *figure C-22*.

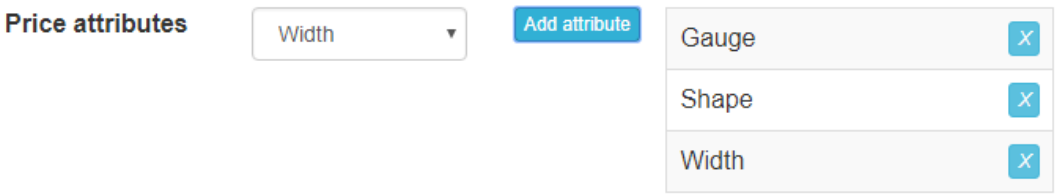


Figure C-22 Insert Price Attributes

If Product has a colour, click on the check box that shown in *figure C-23*.

Figure C-23 colour

If Product uses sheets to Manufacturing, click on the check box that shown in *figure C-24*.

Figure C-24 Sheets

Enter the Unit Price and Pre-Order level to the table and click on the add product button to add data to the table using the interface shown in *figure C-25*.

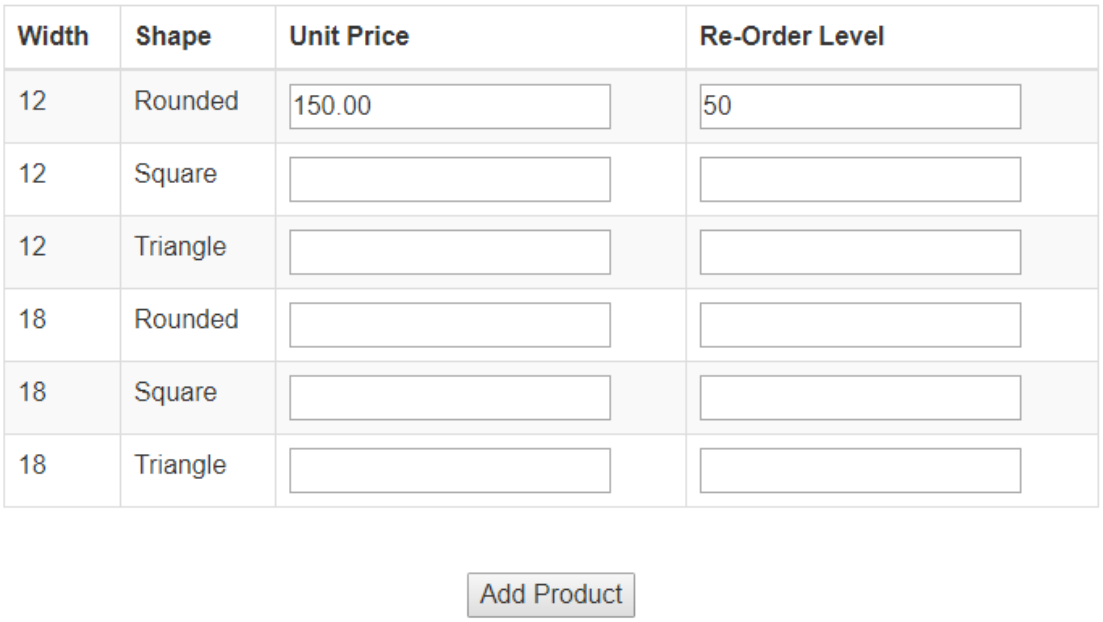


Figure C-25Add Price

View Suppliers

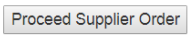
Interface in *figure C-26* shows all Suppliers in the database with their status. To Add New Supplier click Add new Supplier Button. Suppliers can search by Supplier name.

Figure C-26 View Supplier List

Add Supplier Order

Figure C-27 shows Add supplier order interface.

Select the Supplier Name, Order Date, Category and Item Name from drop down lists.

Available Quantity and Unit Price will show below. If product has a colour Select a Clour from Drop down box. Then click Add to Table Button to add item to the Supplier Order Table. Add All Items to the Table and then click 

button to submit the Order.

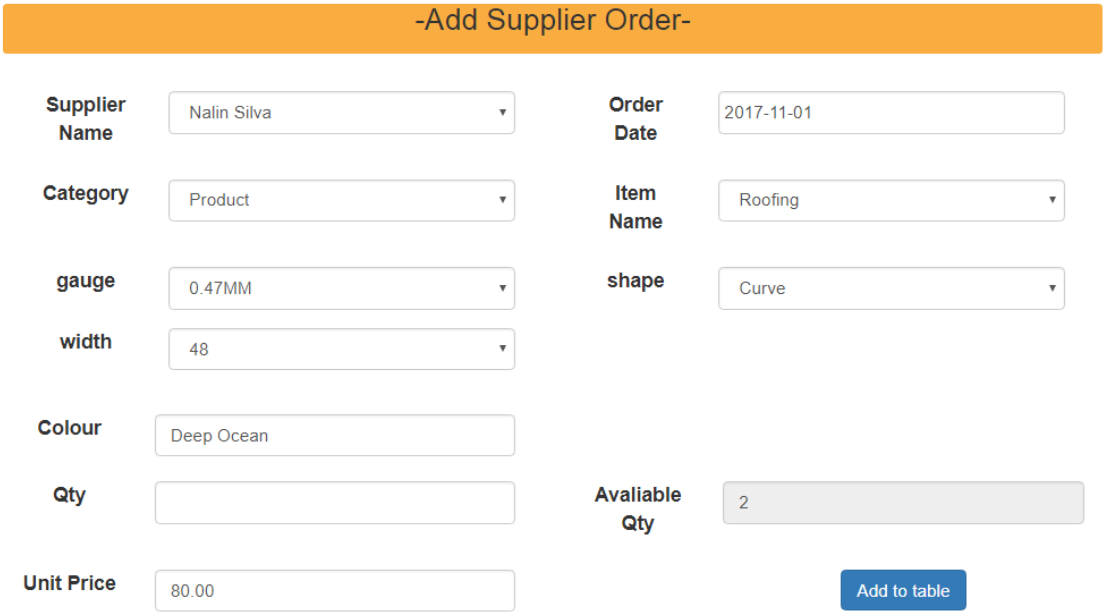


Figure C-27 Add Supplier Order

Add Customer Order

Figure C-28 shows interface to add customer order.

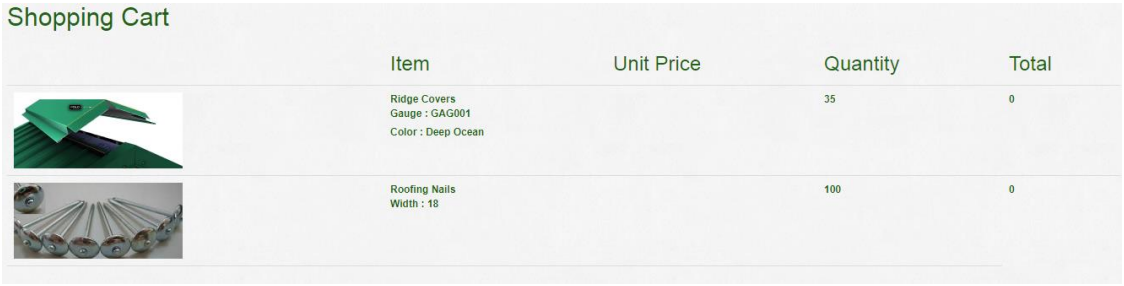


Figure C-28 Add Customer Order Interface

Confirm Customer Order

After Adding All items to the Shopping Cart click **Process order** Button to Process Order.

Orders that added customer confirm by Manager using interface shown in *figure C-29*.

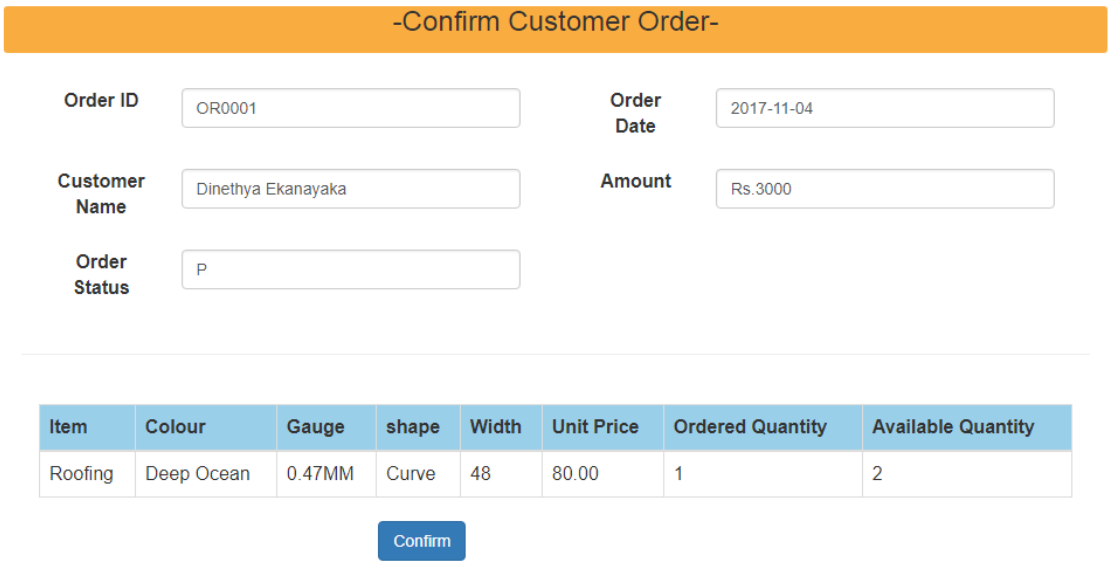


Figure C-29 Confirm Order view

Customer Registration

Before place an order Customer has to register as a customer. Using interface shown in *figure C-30*.

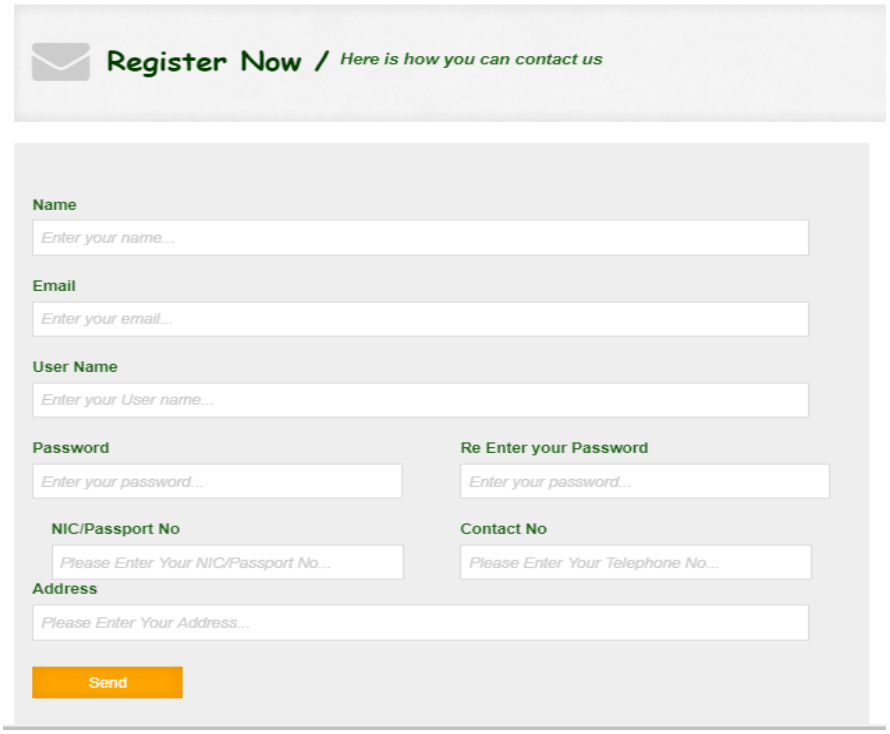


Figure C-30 Customer Register View

Customer Detail List View

User can view List of registered customers as shown in *figure C-31*. User can search customer with by Customer Name. Customer status view customer is active or deactivate.

User Can Add New Customer Using Add New Customer Button. View Button view a particular user's Information and Edit Button Redetect to Edit Customer Page.

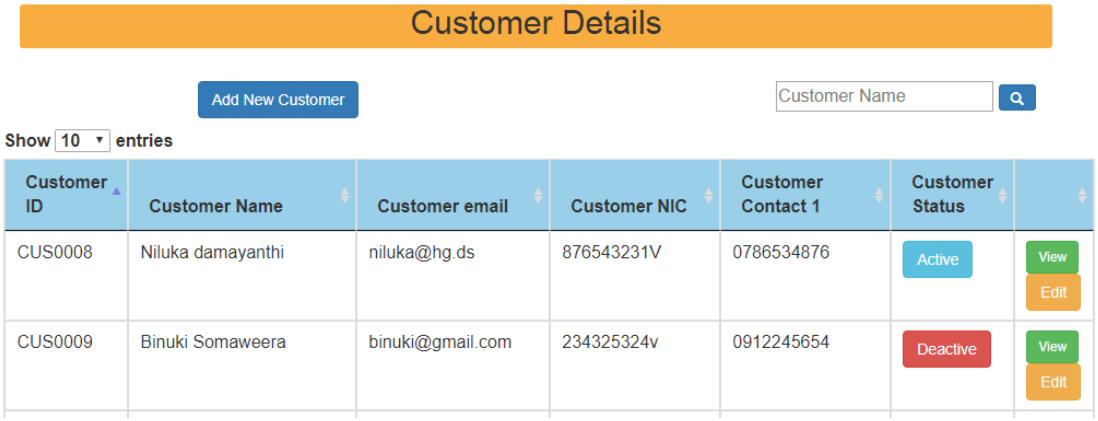


Figure C-31 Customer Detail List View

Customer Feedback Interface

Customer sends a Feedback through the web site using Customer feedback page shown in *figure C-32*.

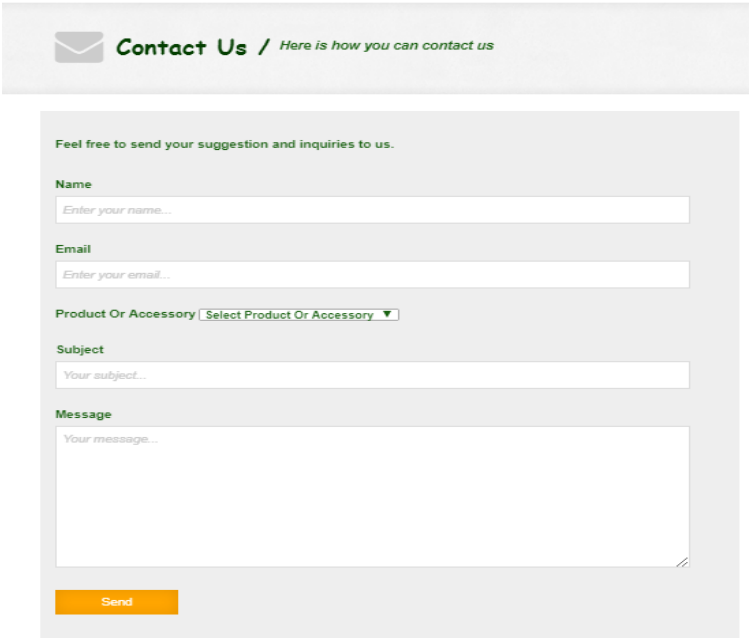


Figure C-32 Customer Feedback view

Product and Accessory Page

The Web page shown in figure C-33 Page is in Web site Under Product and category tab.

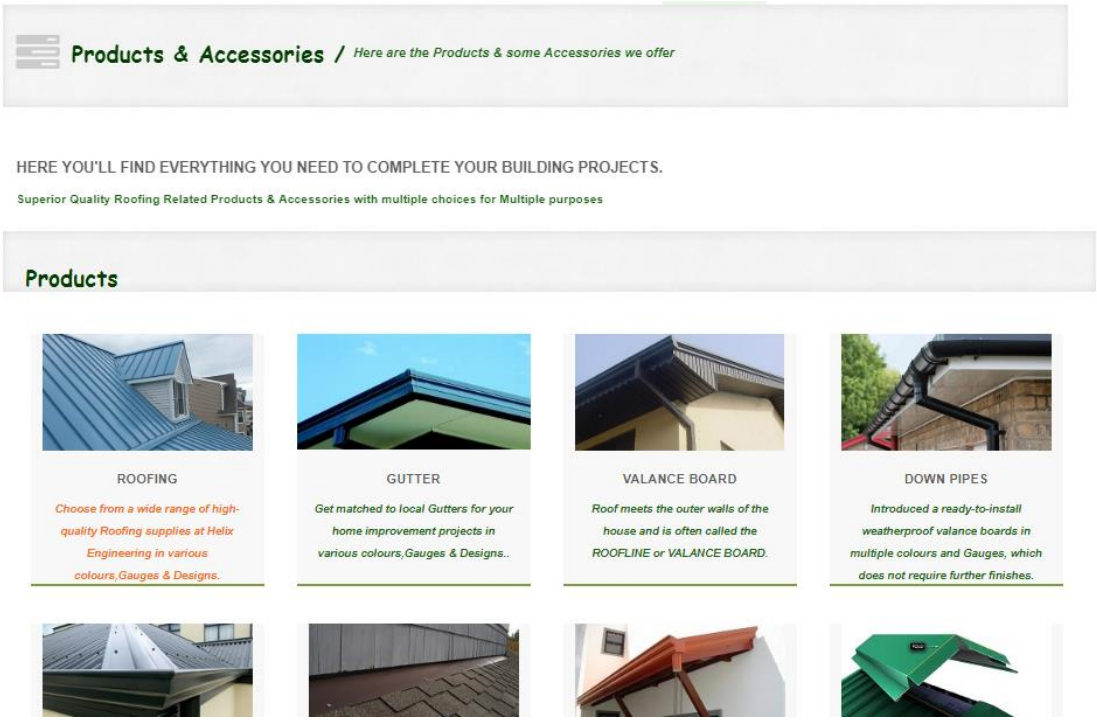


Figure C-33 Product and Accessory View page

APENDIX D : MANAGMENT REPORTS

Re-Order Levels for product

Management can use this report to get information about available product levels and re-order levels.

Re-order level report is shown in *figure D-1*

HELIX

Helix Engineering

No: 658/1, Galle Road
Wadduwa
+94 382 285 885
+94 776 282 699
enghelix@gmail.com

Re Order Level

Date: 2017- 10-29

Product Id	Product Title	Gauge	Colour	Witdth	Re-Order Level Inches	Product Quantity
PR 0001	Roofing	0.47	Cottage Green	36	200	250
PR 0002	Roofing	0.40	Deep Ocean	48	200	100
PR 0003	Roofing	0.47	Deep Ocean	48	200	30
PR 0005	Roofing	0.40	Cottage Green	48	200	50
PR0008	Sheet	0.40	Deep Ocean	48	400	420
PR0010	Sheet	0.47	Cottage Green	36	400	445

Figure D-1 Re-order level product report

Weekly Sales report

Top level management can use this report to get information about sales for given time period. Sales report is shown in *figure D-2*

HELIX

Helix Enginearing

No: 658/1, Galle Road
Wadduwa
+94 382 285 885
+94 776 282 699
enghelix@gmail.com

Weekly Sales Report

for
2017-11-01 to 2017-11-07

Date:

Order_id	Customer Id	Order Date	Amount
OR0001	Dinethya Ekanayaka	2017-11-03	Rs.25 000
OR0002	Binuki Somaweera	2017-11-03	Rs.80 000
OR0003	Niluka damayanthi	2017-11-03	Rs.50 000
Full Quantity			Rs.155 000

Figure D-2 Sales report

Chart for Order Status percentage

Order status as a percentage chart is shown in *figure D-3*

Figure D-3 Order status chart

Top selling Products

Figure D-4 Shows Top selling Products Chart of the helix system.

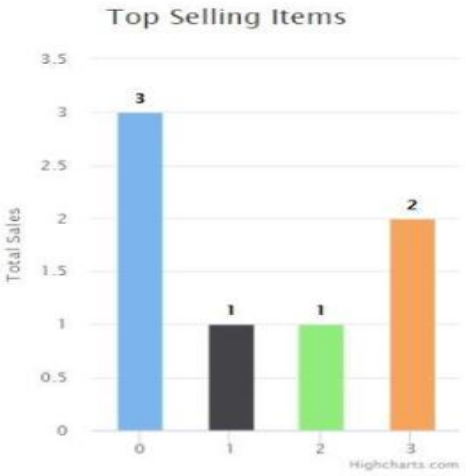
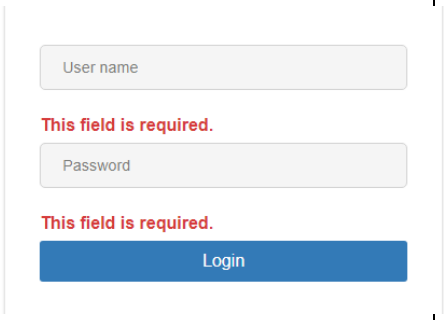
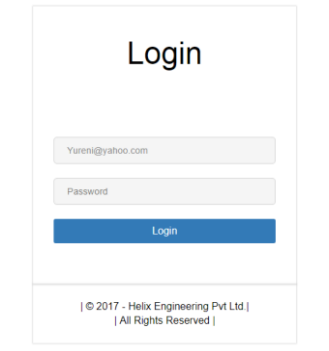


Figure D-4 Top selling Products Chart

APENDIX E : TEST RESULTS

Login Management

Test Number	Test Description	Steps to test	Expected Results	Status
1	Validate User input Details	Enter correct User name Enter correct Password		✓
2	Validate User input Details	Submit Form keeping all fields empty.		✓
3	Validate User input Details	Enter wrong User name Enter correct Password	Redirect to the Login page 	✓

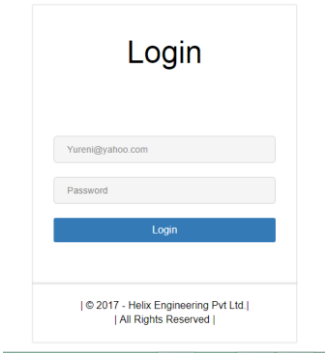
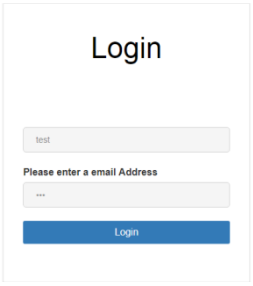
4	Validate User input Details	Enter wrong User name Enter wrong Password	Redirect to the Login page 	✓
5	Validate User input Details	Enter wrong User name(not an email address)		✓

Table E-1 Login Management test Results

User Management

Test Number	Test Description	Steps to test	Expected Results	status
1	Validate User Details Adding	Enter correct Details for all the fields.	Redirect to the User list Page and Display “Successfully Added” Message. 	✓

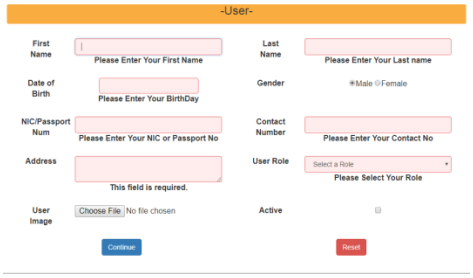
2	Validate User Details Adding	Submit Form keeping all fields empty.		✓
3	Update User Informatio n	Select user from User List ,click on the Edit button , update user information and submit	Display “Successfully Updated” Message and redirect to the User list Page.	✓
4	Update User Informatio n			

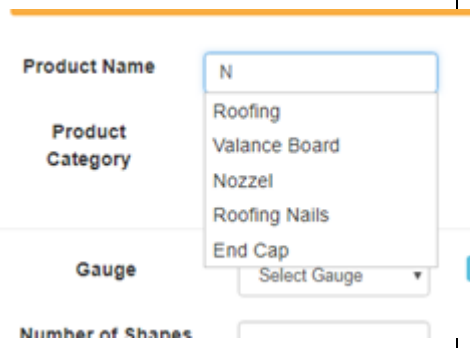
Table E-2 User Management test Results

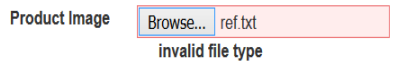
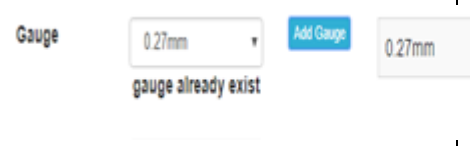
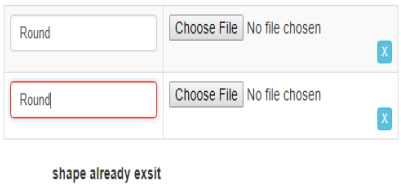
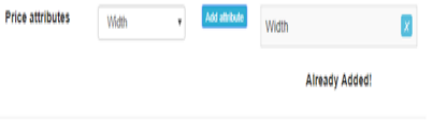
Order Management

Table E-3 Order Management

Product Management

Test Numbe r	Test Descriptio n	Steps to test	Expected Results	Status
1	Validate Add new Gauge	Enter correct Details for all the fields.	Redirect to the Gauge list Page and Display “Successfully Added” Message	✓

	Validate Add new Gauge	Submit Form keeping all fields empty.		✓
2	Validate Add new Colour	Enter correct Details for all the fields.	Redirect to the Colour list Page and Display “Successfully Added” Message.	✓
	Validate Add new Colour	Submit Form keeping all fields empty.		✓
3	Validate Add new Product	Enter correct Details for all the fields.	Redirect to the Gauge list Page and Display “Successfully Added” Message	✓
	Validate Add new Product	Type Product Name in the Product Name field.		
4	Validate Add new Product	Submit form keeping all the fields empty	Show Error message for Product Name and Category.	✓

	Validate Add new Product	Submit form without uploading a image file.		
5	Validate Add new Product	Try to Add Same Gauge twice.	Show Error message “Already added 	✓
6	Validate Add new Product	Try to Add Same Width twice.	Show Error message “Already added “	✓
	Validate Add new Product	Try to Add Same Shape twice.		✓
7	Validate Add new Product	Try to Add Same Price Attribute twice.	Show Error message “Already added “ 	✓
8	Validate Add new Product	Try to Add a Price Attribute values not added.		✓
9	Validate Add new Product	Delete a Gauge value After generating Unit Price table		✓

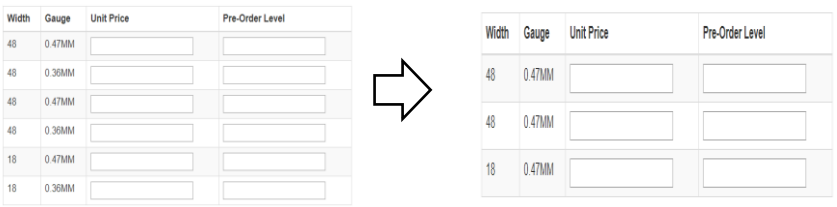
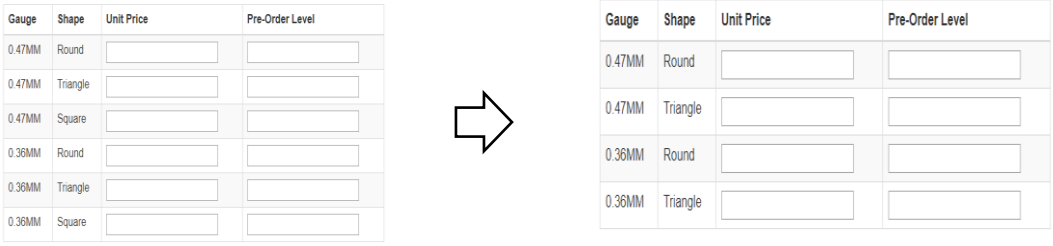
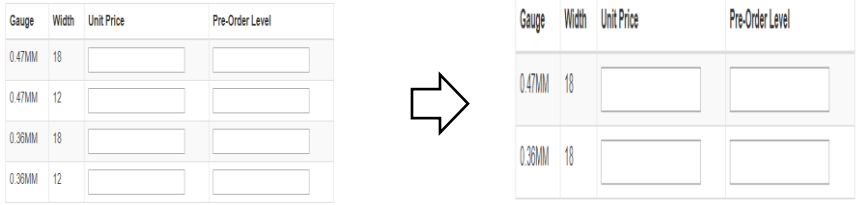
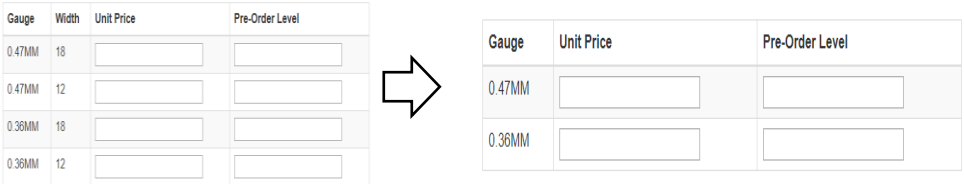
				
10	Validate Add new Product	Delete a Shape value After generating Unit Price table		✓
				
11	Validate Add new Product	Delete a Width value After generating Unit Price table		✓
				
12	Validate Add new Product	Delete a Price attribute value After generating Unit Price table		✓
				

Table E-4Product Management Test Results

Test Cases for system Login

Table E-5 Shows Test cases for System Login

Test Number	Test Description	Steps to test	Expected Results
1	Validate User input Details	Enter correct User name Enter correct Password	Successfully login to the system And Show Dashboard Welcome Message
2	Validate User input Details	Submit Form keeping all fields empty.	Display Error Message “Please Enter Username”, “Please Enter Password”.
3	Validate User input Details	Enter wrong User name Enter correct Password	Redirect to the Login page
4	Validate User input Details	Enter wrong User name Enter wrong Password	Redirect to the Login page
5	Validate User input Details	Enter wrong User name(not an email address)	Display Error Message “Please Enter email address”.

Table E-5 test case for user login

Test cases for User Management Module

Table E-6 Shows Test Cases for User Management

Test Number	Test Description	Steps to test	Expected Results
1	Validate User Details Adding	Enter correct Details for all the fields.	Display “Successfully inserted” Message and redirect to the User list Page.
2	Validate User Details Adding	Submit Form keeping all fields empty.	Display Error Messages for required fields.
3	Update User Information	Select user from User List ,click on the Edit button , update user information and submit	Display “Successfully Updated” Message and redirect to the User list Page.
4	Update User Information	Select user from User List ,click on the Edit button , update user information and submit	Display “Record Not Updated” Message and redirect to the User list Page.

Table E-6Test cases for User Management Module

User Acceptance testing

UAT for the SSMSHE was carried out in the Helix Engineering working Environment. Four System Users and real transaction data sets were used to run acceptance testing. Users' activities were monitored while they were working with the system.

After checking the system suggestions and some feedbacks collected using standard set of questions provided in paper to the Proprietor, General Manager, and Marketing Manager of the company and Shop Keeper. Finally the result of the UAT showed that the system is easy to handle and also web site is very useful to the company and they were satisfied with the system. Summary of their feedback is given in the Appendices.

Questionnaire for User Acceptance testing

Figure E-1 Shows User Acceptance Testing Questionnaire

User feedback form for Web based stock and sales management system and web site.

Name of the Employee: T.V.L. Silva

Designation : Proprietor

No	Question	Feedback			
	Common areas	Very good	Good	Average	Week
1	Overall Attractiveness of the system		✓		
2	Overall Attractiveness of the web site	✓			
3	Understandability of the Error messages.	✓			
4	Privilege which set to users	✓			
5	Data entering easiness	✓			
6	Calculate of receipt and reports		✓		
	Page wise				
7	New Product Item Generation and Adding Page	✓			
8	Order Detail Adding Page		✓		
9	User Detail handling Page			✓	
10	Order Display and Process Page		✓		
11	Supplier Order Adding Page and process	✓			
12	Customer Detail Handling Page			✓	
13	Stock handling	✓			
14	Report Generation		✓		

Are You Satisfied with the system and intended functionality mapping it with business process?
Yes, when Considering the Overall process and Usefullness of the System this system Satisfy my requirements.

HELIX ENGINEERING

Proprietor

Employee Signature

2017/10/20

Date

Figure E-1User Acceptance Testing Form

APENDIX F : CODE LISTING

Select all Unique Product item From Database

code segment shown in *figure F-1* selects a unique product Item from Product Table.

```
function get_product_dlt_by_id($data) {
    $sql='SELECT * FROM ' . PRODUCT . 'WHERE pro_id="'.$data['id'].'"';
    $res=  mysqli_query($this->db, $sql);
    $dtls=array();
    $stck_dtls=  mysqli_fetch_object($res);
    $dtls['$stck_dtls']=$stck_dtls;
    $dtls['$stck_attr']=array();
    $gaugs = $this->get_product_gauge($data);
    $wdth = $this->get_product_wdth($data);
    $shps = $this->get_product_shaps($data);

    if (count($gaugs)>0) {
        $dtls['$stck_attr']['gauge'] = $gaugs;
    }
    if (count($wdth)>0) {
        $dtls['$stck_attr']['wdth']=$wdth;
    }
    if (count($shps)>0) {
        $dtls['stck_attr']['shps']=$shps;
    }
    return $dtls;
}
```

Figure F-1 Select Product Item

Get Customer Order Details.

Code segment shown in *figure F-2* fetch All Details about a Customer Order.

```
function get_ordr_dtl($id) {
    $sql = ' SELECT * FROM t001_02_order_detail od '
            . 'INNER JOIN m006_product p ON od.item_id=p.pro_id '
            . 'INNER JOIN m012_width w ON od.width_id =w.width_id '
            . 'INNER JOIN m005_colour c ON od.colour_id=c.colour_id '
            . 'INNER JOIN m007_shape s ON od.shape_id=s.shape_id '
            . 'INNER JOIN m004_gauge g ON od.gauge_id=g.gauge_id where order_id= "' . $id . '"';

    $result = mysqli_query($this->db, $sql);
    $order_dtls = array();
    while ($row = mysqli_fetch_assoc($result)) {
        $order_dtls[] = $row;
    }
    return $order_dtls;
}
```

Figure F-2 Get Customer Detail code segment

User Controller Page

This Code snippet *Figure F-3* checks that the user exists according to the input in login page. If exists Then checks the password validity. If password is correct check the user status weather user's account is enabled or disabled. If enabled, continue to the dashboard otherwise redirect to the login page with an error message.

Figure F-3 Shows Code Segment for User Controller Page

```
function login($data) {
    $is_login = false;
    $sql = 'select * from ' . EMPLOYEE_LGN . ' el JOIN ' . EMPLOYEE .
            ' e ON  e.emp_id=el.emp_id where el.user_name= "'
            . $data['username'] . '"  and el.password = "' .
            sha1($data['password']) . '" AND e.emp_status="1"';
    $result = mysqli_query($this->db, $sql);
    $user_array = mysqli_fetch_object($result);
    if (count($user_array) > 0) {

        $this->set_session_data($user_array);
        $is_login = true;
    }

    return $is_login;
}
```

Figure F-3 User Controller Page

Insert, Update and View Employee

Data inserting Editing and viewing are done through the same interface to use system more effectively.

Validate Add Employee

Adding a user to the system is a main requirement identified in the system analyzing stage. This code segment (*Figure F-4)* validates 'add user form' data using JavaScript technology when adding a new user and handle errors before send it to the database.

```
<script>
    $(function() {
      $('#add_usr_frm').validate({
        rules: {
            emp_fname: {
                required: true,
            },
            emp_lname: {
                required: true
            },
            emp_email: {
                required: true,
                email:true
            },
//            some code segment at the middle
            password: {...3 lines },
            emp_dob: {...3 lines },
            emp_nic: {
                required: true,
                minlength:10
            },
            emp_tel: {...3 lines },
            emp_address: {
                required: true
            },
            role_id: {...4 lines }

        },
        messages: {
              emp_fname: {
                required:"Please Enter Your First Name"
```

Figure F-4 Validate Add Employee

Get Employee Information

This is the code segment for Fetch all the Employee information from the DB

Figure F-5 Shows Code Segment for Get Employee Information.

```
function get_user() {
    $sql = 'SELECT * FROM ' . EMPLOYEE;
    $result = mysqli_query($this->db, $sql);
    $sqlresult = array();
    while ($row = mysqli_fetch_assoc($result)) {
        $sqlresult[] = $row;
    }
    return $sqlresult;
}
```

Figure F-5 Fetch User Data

Add Employee to the Database

This code snippet shows how data send to the database from Add user page.

Figure F-6 Shows User Interface for Add New Product

```
function insert_emp($data, $files) {
    $is_success = false;
      ----------genarate empID--------------------
    $seq_no = generate_seq_no(EMPLOYEE, 'seq_num');
    $emp_id = generate_id('EMP', EMPLOYEE, 'seq_num');
      ----------------create file path-------------
    $file_path = $this->add_emply_img($files, $emp_id);

    $sql = 'INSERT INTO ' . EMPLOYEE . ' (emp_id,emp_fname,emp_lname,emp_email,emp_dob,emp_nic,emp_tel,'
          . 'emp_gender,emp_add,role_name,emp_image,seq_num) '
          . 'values("' . $emp_id . '","' . $data['emp_fname'] . '","' . $data['emp_lname'] . '","' . $data['emp_email']
          . '","' . $data['emp_dob'] . '","' . $data['emp_nic'] . '","' . $data['emp_tel'] . '","' . $data['emp_gender']
          . '","' . $data['emp_address'] . '","' . $data['role_id'] . '" ,"' . $file_path . '",' . $seq_no . ')';
    $res = mysqli_query($this->db, $sql) > 0;

    if ($res) {
        //encrypt password
        $pw = sha1($data['password']);
        $sqlrole = 'INSERT INTO ' . EMPLOYEE_LGN . '  (user_name,emp_id,password) values("' . $data['emp_email'] .
              '","' . $emp_id . '", "' . $pw . '"   )';
        $is_success = mysqli_query($this->db, $sqlrole) > 0;
    }

    return $is_success;
}
```

Figure F-6 Insert User

Update User

Following *Figure F-7 Code* segment for Updating a User Information

```
//Update selected emp
    function update_emp_by_id($data, $FILES) {
        $sql = 'UPDATE ' . EMPLOYEE . ' SET emp_fname= "' . $data['emp_fname'] . '",'
                . ' emp_lname = "' . $data['emp_lname'] . '",'
                . ' emp_nic = "' . $data['emp_nic'] . '",'
                . ' emp_tel= "' . $data['emp_tel'] . '",'
                . ' emp_dob= "' . $data['emp_dob'] . '",'
                . ' emp_add= "' . $data['emp_address'] . '",'
                . ' emp_gender= "' . $data['emp_gender'] . '",'
                . ' role_name= "' . $data['role_id'] . '"';
        if (isset($data['status'])) {
            $sql.=',emp_status="1"';
        } else {
            $sql.=',emp_status="0"';
        }

//update image
        $file_path = $this->add_emply_img($FILES, $data['emp_id']);
        if ($file_path != '') {
            $sql.=',emp_image="' . $file_path . '"';
        }
        $sql.= ' WHERE emp_id= "' . $data['emp_id'] . '"';

        $is_success = mysqli_query($this->db, $sql) > 0;
        return $is_success;
        print_r($is_success);
    }
```

Figure F-7 Updating a User

Add Gauge

Figure F-8 Code Segment *Shows* how Gauges added from the list to product details

```
$('.add_gauge').click(function() {
    if ($('#gauge').val() != '') {
        var g_val = $('#gauge').val();
        var g_text = $('#gauge :selected').text();
        if (!chk_gauge_exist(g_val)) {
            $('.gauge_tbl tbody').append(
                    $('<tr>').append(
                    $('<td>', {text: g_text}).append($('<input>', {type: 'hidden', value: g_val, name: 'gauge_id[]'})
                    ).append($('<a>', {class: 'btn btn-info btn-xs cls-btn g_cls '}).append(
                    $('<i>', {text: 'Remove'})
                    )
                    )
                    )
                    )
            attri_data['Gauge'].push({key: g_val, value: g_text});

        }
        generate_price_tbl()
    }
})
```

Figure F-8 Add Gauge

Add Shape

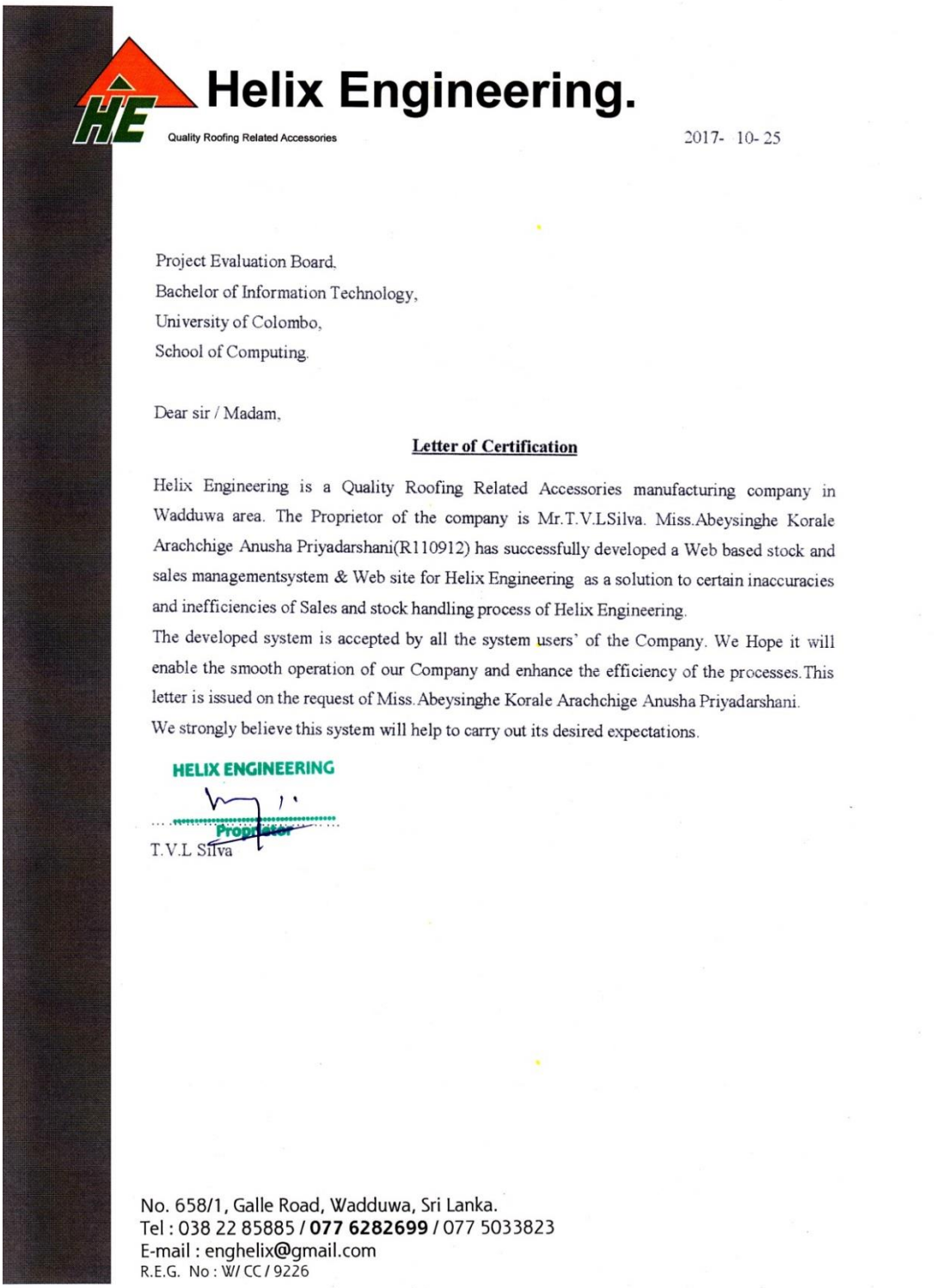
Figure F-9 Code Segment for Add shapes and shape images to the Product details.

```
$('.shp_tbl').on('click', '.s-cls-btn', function() {
    var tr = $(this).closest('tr');
    var idx = $(tr).find('input').attr('idx');
    attri_data['Shape'].splice(idx, 1)
    $(tr).remove()
    $.each($('.shp_tbl tbody tr'), function(k, v) {
        $(v).find('input').attr('idx', k);
    })

    if (attri_data['Shape'] == 0) {
        $.each($('.attri_tbl input'), function(k, v) {
            if ($(v).val() == 'Shape') {
                $(v).parents('tr').remove()
                return false;
            }
        })
    }
```

Figure F-9 Add Shape

APENDIX G : CLIENT CIRTIFICATE



Helix Engineering.

Quality Roofing Related Accessories

2017- 10- 25

Project Evaluation Board,
Bachelor of Information Technology,
University of Colombo,
School of Computing.

Dear sir / Madam,

Letter of Certification

Helix Engineering is a Quality Roofing Related Accessories manufacturing company in Wadduwa area. The Proprietor of the company is Mr.T.V.LSilva. Miss.Abeysinghe Korale Arachchige Anusha Priyadarshani(R110912) has successfully developed a Web based stock and sales managementsystem & Web site for Helix Engineering as a solution to certain inaccuracies and inefficiencies of Sales and stock handling process of Helix Engineering.

The developed system is accepted by all the system users' of the Company. We Hope it will enable the smooth operation of our Company and enhance the efficiency of the processes.This letter is issued on the request of Miss.Abeysinghe Korale Arachchige Anusha Priyadarshani.

We strongly believe this system will help to carry out its desired expectations.

HELIX ENGINEERING

Proprietor

T.V.L Silva

No. 658/1, Galle Road, Wadduwa, Sri Lanka.
Tel : 038 22 85885 / **077 6282699** / 077 5033823
E-mail : enghelix@gmail.com
R.E.G. No : W/ CC / 9226

Figure G-1 Client Certificate

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GLOSSRY

1. **Asynchronous JavaScript and XML (AJAX)**

   Ajax is a group of interrelated web development techniques used on the client-side to create asynchronous web applications. With Ajax, web applications can send data to, and retrieve data from, a server asynchronously (in the background) without interfering with the display and behavior of the existing page. Ajax is not a single technology, but a group of technologies. HTML and CSS can be used in combination to mark up and style information.

2. **Apache HTTP Server**

   An open source HTTP web server which is a project of Apache Foundation.

3. **Cascade Style Sheet (CSS)**

   Cascading Style Sheet (CSS) is a simple mechanism for adding style (e.g : fonts, colors, spacing, etc..) to Web documents.

4. **Database**

   An organized collection of data

5. **Graphical User Interface**

   This is a visual way of interacting with a computer using items such as windows, icons and menus, used by most modern operating systems.

6. **Hypertext Processor**

   PHP is a server side scripting language designed for web development but also used as a general purpose programming language.

7. **Hypertext Transfer Protocol Secure (HTTP)**

   This is a set of standards that allow users of the World Wide Web to exchange information found on web pages.