Storage Tank Design Automation

Software Requirements Specification

Version 1.0

2018/02/01

Phezile Mazibuko

Johann Möller

Graduate Programmers

Prepared for

ThyssenKrupp—Graduate Software Development

HOD: Coetzee Louis

January 2018

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Description** | **Author** | **Comments** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Signature** | **Printed Name** | **Title** | **Date** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Table of Contents**

Revision History ii

Document Approval ii

1. Introduction 1

1.1 Methodology 1

1.2 Purpose 2

1.2 Scope 2

1.3 Definitions, Acronyms, and Abbreviations 2

1.4 References 3

1.5 Overview 3

2. General Description 3

2.1 Product Perspective 3

2.2 Product Functions 4

2.3 User Characteristics 4

2.4 General Constraints 5

2.5 Assumptions and Dependencies 5

3. Specific Requirements 6

EMPLOYEE USE-CASE REPORT 6

3.1 External Interface Requirements 6

3.1.1 User Interfaces 6

3.1.2 Hardware Interfaces 6

3.1.3 Software Interfaces 7

3.1.4 Communications Interfaces 7

3.2 Functional Requirements 7

3.3 Use Cases 9

3.3.1 Use Case #1 9

3.4 Non-Functional Requirements 10

3.4.1 Performance 10

3.5 Constraints 11

3.6 Logical Database Requirements 11

4. Analysis Models 12

4.1 Sequence Diagrams 12

NB: Still have to download Microsoft Visio 12

4.2 Data Flow Diagrams (DFD) #1 12

NB: Still have to download Microsoft Visio 12

5. Change Management Process 13

# 1. Introduction

The Storage Tank Design Automation is a system that will automate the design process of a storage tank system (including pump, line and valve specifications) from the specifications document through to the calculations, system layout drawings and project summary. Minimal input will be required from the user.

The system will be based on a Windows desktop application and users will have to have all the relevant software installed on their computers.

## Methodology

The Software Development Life Cycle is a development process which helps through the planning, analysis, design, implementation and support of an application in order to improve the quality of software and the overall development process.

SDLC comprises of six phases:

#### **Planning and requirement analysis**

This phase consist of providing an overview document of the project’s goals which relates to the project requirements and scope

#### **Defining requirements**

In this phase of the SDLC, after the requirements have been analyzed from the first phase, product requirements must be clearly defined, documented, and must be approved by the client or customer.

**Designing the product architecture**

Based on the requirements that have already been specified, this phase defines all the architectural modules of the product with its communication and data flow representation with the external and third party modules.

**Building or developing the product**

The actual development start and the product is built at this stage. The design is performed in a detailed and organized manner and therefore codes can be easily accomplished.

**Testing the product**

Testing is normally included in all stages of the SDLC but this stage refers to testing only the stage of the product where product defects are tracked, reported, fixed, and retested until the product reaches the defined quality standards.

**Deployment and maintenance**

In this stage the product is deployed after the product has been tested and ready.

## Purpose

The Leads to Leads management system is a web application that will include all the requirements and functionalities necessary that will help engineers to simplify the Leads to Leads process effectively and efficiently.

In order to get the services the application will offer, the users (ThyssenKrupp Admin and employee) will have to be connected to the internet. This will help to facilitate the Leads to Leads fertile ground process.

## Scope

* There are two basic users- **ThyssenKrupp admin and Employee**.
* All users have their own profile.
* Admin can view, create, update and delete employee’s profile.
* An Employee can logon to the system. He/she do what he is responsible to do and commit after he has done and also can be able to print out the report and attached a document as a proof.

## Definitions, Acronyms, and Abbreviations

* **C#** is an object-oriented programming language used with XML-based Web services on the .NET platform and designed for improving productivity in the development of Web applications.
* **Microsoft Visual Studio** is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as web sites, web apps, web services and mobile apps.
* **MVC** Model–view–controller (**MVC**) is a software architectural pattern commonly used for developing user interfaces that divides an application into three interconnected parts. This is done to separate internal representations of information from the ways information is presented to, and accepted from, the user.
* **HTML** (Hyper Text Markup Language): it is used to create static web pages.
* **CSS** helps Web developers create a uniform look across several pages of a Web site. Instead of defining the style of each table and each block of text within a page's HTML.
* **JavaScript** an object-oriented computer programming language commonly used to create interactive effects within web browsers.
* **MySQL**: it is a database management system which provides a flexible and efficient database platform to raise strong business applications. .
* **HTTP** (Hypertext Transfer Protocol): is a service protocol.
* **HTTPS**: **HTTP** (Hypertext Transfer Protocol secure): is a service protocol.

## References

<http://aakashtechsupportdocs.readthedocs.org/en/latest/prodpersp.html>

<http://findarticles.com>

<http://ezinearaticle.com>

## Overview

Developing the lead to lead management system will help provide a quick management of the fertile ground process.

# 2. General Description

A lead to lead management system is one that will be used by engineers or employers to easily management fertile ground process. The system will use computer-aided software engineering that will manage the system easily. It will also use different programming languages that perform different features and that will make the system request and respond faster. The system will allow admin to do the following requirements:

Specific requirements are:

* Create employee’s login details
* View employee’s profile.
* Update employee’s profile.
* Delete employee’s profile from the system.

## 2.1 Product Perspective

The product of the system will be a system management that will help ThyssenKrupp engineers to manage Leads to Leads fertile ground process. It is a web based Leads to Leads management system.

The following are the main features that will be included in Leads to Leads management system:

* Cross platform support: Offers operating support for most of the known and commercial operating systems.
* User account: The system allows admin to create employees account in the system and provide features of updating and viewing profiles.
* Leads to lead management system: The system will allow the engineer to easily manage fertile ground process. The system will also allow an employee to login first.

## 2.2 Product Functions

The Leads to lead management system will perform the following functions:

1. **Upload document**

The system allow user to upload document on the system.

1. **Print Report**

The system will allow user print or save report for employers.

1. **Save information**

The system will save all the information on the database for future use.

1. **Register**

The system will allow admin to register all the engineers who are permitted to use the system and the system will generate logins details for each user.

1. **Login and Logout**

The system must allow the user to login with the provided login details and also logout after a user wishes to end the login session.

## 2.3 User Characteristics

The system will consider two different type of users and each user will perform different function in the system.

2.3.1. **Employee**

The employee is a type of user that will interact with the system daily to manage Leads to Leads fertile ground process. Employee must have access to the internet, and must be familiar with the usage of the basic Graphical User Interface (GUI).

2.3.2 **Admin**

Admin will interact with the system to view and update employees profile or to deal with employees issues. This user is expected to be familiar with the interface of the tech support system.

|  |  |
| --- | --- |
| **Use case** | **Description** |
| Sign in | Admin must sign in to… |
| Add employee profile | Admin has to add employee profile containing personal details |
| View employee profile | Admin can view an employee’s profile |
| Update employee profile | Admin has the option to update employee’s profile |
| Delete employee’s profile | Admin has the option to remove employee from the system |
| Search | Admin must be able to search for a particular employee |

## 2.4 General Constraints

There are no items that will limit the developer’s options from designing the system.

## 2.5 Assumptions and Dependencies

Assumption1. Cloud hosting

1. a) The system will be hosted in the cloud

1. b) Cloud hosting will make the system scalable and flexible.

1. c) Cloud hosting will give the system the load balancing feature.

Assumption2. Users

2. a) Content is available and provided by the users.

2. b) Users will make effective use of the system

2. c) The system will enhance the program experience for users

Assumption3. Developers

3. a) The requirements are met and clearly defined.

3. b) The client is available for clarifications and questions.

Dependancy1. Software development is based on an integrated development environment (IDE) that is readily available.

Dependancy2. Internet connection that is readily available in order to access the system.

# 3. Specific Requirements

In this section we will define the specific requirements that will guide the project’s software design, implementation, and testing.

Specific requirements are:

* Upload document as a proof
* Print or save report
* Choose all the required information on Leads to Leads Management page and save on a database.
* Register and deal with employees issues.

**ADMIN USE-CASE REPOPT**

## EMPLOYEE USE-CASE REPORT

|  |  |
| --- | --- |
| **Use Case** | **Description** |
| Login | Employee must be able to use his/her account details to log into the system. |
| Save | Employee must able to select all the required information on checkboxes and radio button and save |
| Print/Save Report | Employee must be able to save or print out report. |
| Upload file | Employee must be able to upload a file or document on a system as a proof. |

## 3.1 External Interface Requirements

### 3.1.1 User Interfaces

The user interface for the software shall be compatible to any browser such as Internet Explorer, Google chrome, or Mozilla which user can access to the system.

The user interface shall be implemented using any tool or software package.

### 3.1.2 Hardware Interfaces

**Minimum Requirements:**

|  |  |  |  |
| --- | --- | --- | --- |
| Client Side | | | |
|  | Processor | RAM | Disk Space |
| Google Chrome 6 | Intel Pentium 4 | 512MB | 350MB |

|  |  |  |  |
| --- | --- | --- | --- |
| Server Side | | | |
|  | Processor | RAM | Disk Space |
| RAD | Intel Pentium 4 | 1GB | 3.5GB |
| MySQL | 256MB | 500MB  (Excluding data size) |

**Recommended Requirements:**

|  |  |  |  |
| --- | --- | --- | --- |
| Client Side | | | |
|  | Processor | RAM | Disk Space |
| Google Chrome 6 | All Intel | 512MB | 350MB |

### 3.1.3 Software Interfaces

**Client on Internet**

Web Browser, Operating System (any)

**Client on Intranet**

Web Browser, Operating System (any)

**Web Server**

Google engine, Operating System (any)

**Data Base Server**

MySQL, Operating System (any)

**Development End**

RAD (C# .net, ASP.NET MVC, HTML, CSS, JavaScript), MySQL, OS (Windows)

### 3.1.4 Communications Interfaces

* Client (system user) on Internet will be using HTTP/HTTPS protocol.

## 3.2 Functional Requirements

3.2.1. Add employee profile

|  |  |
| --- | --- |
| **Use Case Name** | Add employee profile |
| **3.2.1.1 Introduction** | Add employee profile |
| **3.2.1.2 Inputs** | Admin must enter employee’s details |
| **3.2.1.3 Processing** | The system must check if the user already exists, if **YES** the system must notify admin that user already exist, if **NO** the system must register a new user. |
| **3.2.1.4 Outputs** | The system must display message that say the process successful or not successful. |
| **3.2.1.5 Error Handling** | The system must display an error message if an exception occur |

3.2.2. View employee profile

|  |  |
| --- | --- |
| **Use Case Name** | View employee profile |
| **3.2.2.1 Introduction** | View employee profile |
| **3.2.2.2 Inputs** | Admin must click view button and the system must show all employee’s details |
| **3.2.2.3 Processing** | The system must get all employee’s information |
| **3.2.2.4 Output** | The system must display all employee’s information from the database |
| **3.2.2.5 Error Handling** | The system must display an error message if an exception occurs |

3.2.3 Update employee profile

|  |  |
| --- | --- |
| **Use Case Name** | Update employee profile |
| **3.2.3.1 Introduction** | Update employee profile |
| **3.2.3.2 Inputs** | Admin must search employee using identity number or Name. The systems return all details for the specific employee. The employee’s details must be updated accordingly. |
| **3.2.3.3 Processing** | The system must update the employee’s details. |
| **3.2.3.4 Output** | The system must display a message that say details updated on not updated |
| **3.2.3.5 Error Handling** | The system must display an error message if an exception occurs |

3.2.4 Delete employee’s profile

|  |  |
| --- | --- |
| **Use Case Name** | Delete employee’s profile |
| **3.2.4.1 Introduction** | Delete employee’s profile |
| **3.2.4.2 Input** | Admin must click the specific employee’s information that must be deleted and press the delete button |
| **3.2.4.3 Processing** | The system must then delete employee information from database |
| **3.2.4.4 Output** | The system must display a message that say details deleted on not deleted |
| **3.2.4.5 Error Handling** | The system must display an error message if an exception occurs |

3.2.5 Print/Save Report

|  |  |
| --- | --- |
| **Use Case Name** | Print report |
| **3.2.5.1 Introduction** | Print report |
| **3.2.5.2 Input** | Employee must be able to print out report or save report |
| **3.2.5.3 Processing** | The system will save those report along with all the other data in the database |
| **3.2.5.4 Output** | The system must display a message that confirms that the results have been printed or saved. |
| **3.2.5.5 Error Handling** | The system must display an error message if exception occurs |

3.2.6 Upload file

|  |  |
| --- | --- |
| **Use Case Name** | Upload file |
| **3.2.6.1 Introduction** | Upload document. |
| **3.2.6.2 Input** | Employee must upload document. |
| **3.2.6.3 Processing** | The system will save the document along with all the other data in the database. |
| **3.2.6.4 Output** | The system must display a message that confirms that the document has been uploaded. |
| **3.2.6.5 Error Handling** | The system must display an error message if an exception occurs |

3.2.7. Login

|  |  |
| --- | --- |
| **Use Case Name** | Login to Leads to Lead Management System |
| **3.2.7.1 Introduction** | Login to Leads to Lead Management System |
| **3.2.7.2 Input** | Employee must be able to use his/her account details to log into the system |
| **3.2.7.3 Processing** | The system must able to recognize the employee |
| **3.2.7.4 Output** | The system must display a message that confirms that the employee has logged on. |
| **3.2.7.5 Error Handling** | The system must display an error message if an exception occurs |

3.2.8. Search

|  |  |
| --- | --- |
| **Use Case Name** | Search |
| **3.2.8.1 Introduction** | Search |
| **3.2. 8.2 Input** | Admin will search for a specific employee from the database |
| **3.2. 8.3 Processing** | The system will find the specific employee from the database |
| **3.2. 8.4 Output** | The system must display the list of matching records. |
| **3.2. 8.5 Error** | The system must display an error message if exception occurs |

## 3.3 Use Cases

## 3.3.1 Use Case #1

NB: Still have to download Microsoft Visio for drawings

## 3.4 Non-Functional Requirements

### 3.4.1 Performance

The system must be interactive and the delays involved must be little. So in every action-response of the system, there are no immediate delays. In case of opening windows forms, popping error messages, or saving the settings or sessions the delay must be below 2 seconds. The delay to access the database and to perform operations must be less than 2 seconds. When connecting to the server, the communication and the configuration between systems must be done within 20 seconds.

**3.4.2 Reliability**

As the system provides the right tool for discussion, the system must be reliable enough to insert and provide the correct information and must ensure that sensitive data are secured.

**3.4.3 Availability**

One of the big advantages of this system is that it will be based on the cloud and it can be accessed on everywhere and from any device that can access the internet. Data will be stored online. The system uses new trends in IT that promote security, availability, and ease of access.

**3.4.4 Security**

The main security concern is for users account hence proper login mechanism should be used to avoid hacking.

**3.4.5 Maintainability**

As the system is based on the cloud it will be much easier and cheaper as maintenance is done by the supplier. The only thing that is required by the user is the web browser only. If changes need to be made on the system it will only be done on the server side, and little on the client side.

**3.4.6 Portability**

The cloud computing concept is all about portability, the system will easily be portable. There will not be loss of data.

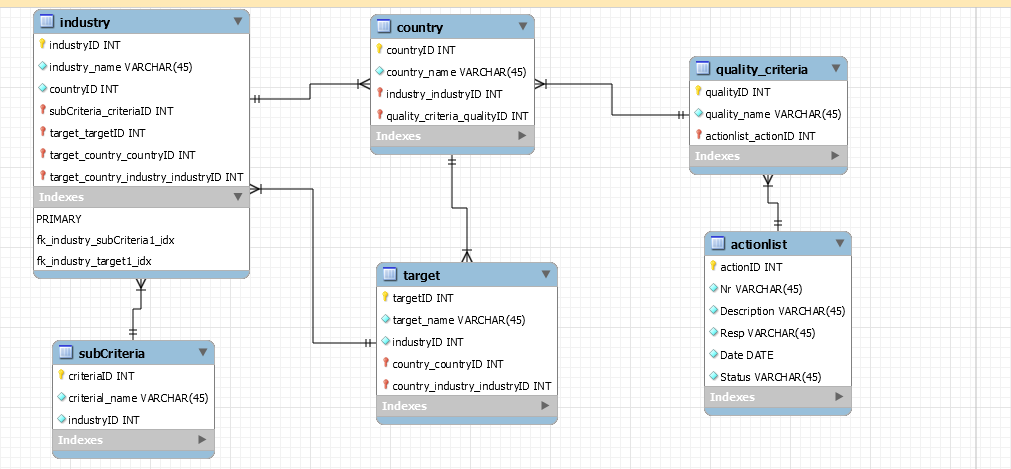
**3.4.7 Disaster Recovery**

The risks associated with disasters are going to be handled by the cloud side/data center.

## 3.5 Constraints

* Login and password identification will have to be provided by users in order to get access to the system.
* The GUI will only be in English.
* This system will require an internet connection in order to perform its functionalities.
* Limited only to HTTP/HTTPS

## 3.6 Logical Database Requirements



# 4. Analysis Models

## 4.1 Sequence Diagrams

## NB: Still have to download Microsoft Visio

## 4.2 Data Flow Diagrams (DFD) #1

## NB: Still have to download Microsoft Visio

# 5. Change Management Process

All the changes in requirements will be done appropriately and where needed on the SRS by graduate programmers. Those changes will be submitted through email by the project coordinator to ThyssenKrupp. ThyssenKrupp will then review and decide whether or not to approve those changes.

# Outputs:

Throughput = 10 m3/hour

Minimum working volume = 1 hour

Density = 832 kg/m3

Substance = Diesel