

SafetyChemPro:

Soliman Alhumayyd CHE- Asim Alghamdi CHE- Ziad Aljumah ICS- Moayad Alheiji ICS- Hussain Alqahtani ME- Mubarak albuainain ME

Introduction

Problem Statement: Plant workers face a problem with misunderstanding safety regulations. So for them, who must comply with safety protocols, SafeChemPro is a software that provides user friendly experience. Unlike traditional learning methods, SafeChemPro is a worldwide accessible software.

- Project impact:**
- 1. Societal Impact**
 - reduce the number of incidents and injuries
 - enables new opportunities in the society
 - Deliver knowledge about safety
- 2. Environmental Impact**
 - reducing leakages and spills
 - resolves the issue of using papers
- 3. Economic Impact**
 - resolves the costly and time-consuming meetings
 - affect the prices of consumer that pay for a product or service due to the quality enhancement of production

- Constraints**
- 1. Equations and data**
 - For the Distillation tower calculations
- 2. Compliance with International Safety Standards**
 - To ensure its effectiveness and relevance.
- 3. Time Limitations**
 - has a relatively short timeframe
- 4. High Security**
 - To prevent cyber attack
- 5. Collaboration with Industrial Contacts**
 - Requires close collaboration with industrial contacts

Target Specifications

- Allowable pressure range of the system : $1 \leq P_{\text{system}} \leq 50$ (bar)
- The bottom composition must be in the range: $0 \leq X_B < X_F = 0.85$ (mol)
- The column operates safely if: $U_{\text{top}} < U_{\text{flooding}}$ (m/s)
- For the separation to happen: $P_{\text{column}} \ll P_{\text{feed}}$ (bar)
- Pump's NPSHA > NPSHR to avoid cavitation in a pump system
- condenser and pump Design pressure and temperature suitable with the system
- pumps and condenser materials should be compatible with the fluid being pumped and condensed to prevent corrosion and degradation

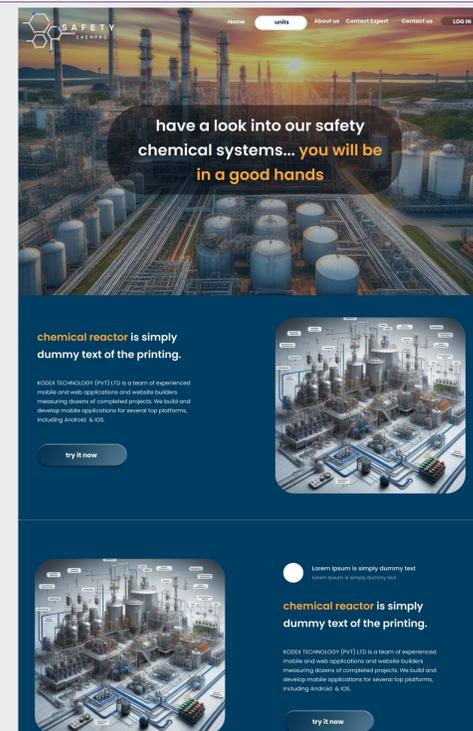
Prototype Design



Home page
This page gives an overview of the website. It introduce the users to our idea and objective



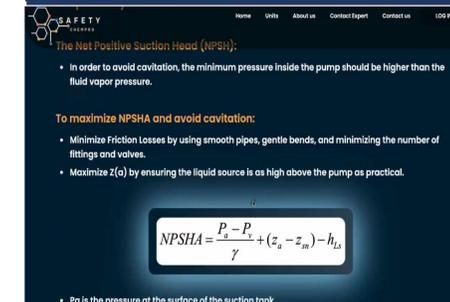
These are pages from the unit "Electric room unit" and "Compressor unit". It shows all the valuable information related to safety to further educate the user



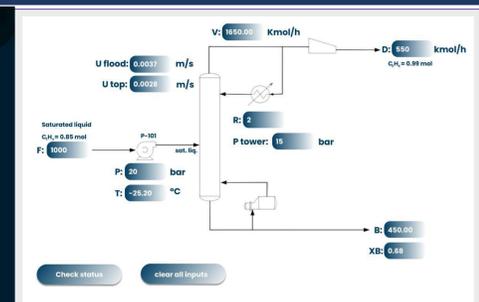
Unit page
This page present to the user all the units through which the user can learn from.



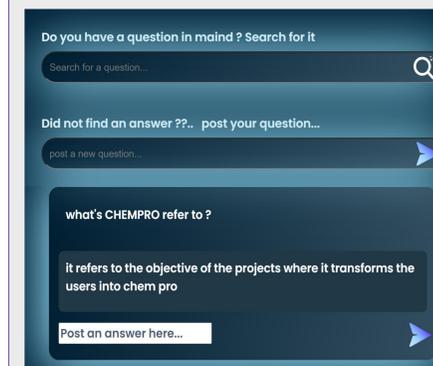
Testing / Validation



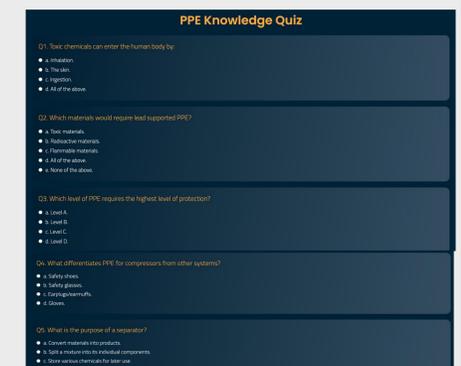
Pump page:
In this page users can easily search for different pump equations, types, and advantages & disadvantages, enabling them to gain a deeper understanding of pumps .



Distillation Tower page:
In this page users can put the necessary inputs to get the desired outputs which are the flooding velocity, velocity of the vapor at the top, bottom and distillate mass and compositions. The mixture is 85 mol % ethylene and 15 mol % ethane



Q&A Page
This page allows the users to search, ask and answer any question. The purpose of this page is to enhance the learning objective of the project where users can educate other users.



Quiz page
This page displays 15 questions related to the units available on the website. The purpose of these questions is to test the user understanding.

Conclusion

SafeChemPro is revolutionizing safety compliance in industrial plants. Its user-friendly software simplifies safety regulations, enhancing global accessibility. Developed by a team of mechanical engineering, computer science, and chemical engineering students, SafeChemPro bridges the gap between regulations and practical implementation.