

## Safety Education for Engineering Graduates

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As process systems are getting more complex, the safety of our current and future working environments is of more concern. Therefore, process safety management concepts are becoming more essential than before. Nevertheless, this has not been properly addressed in all engineering disciplines at universities. As a result, we believe all disciplines need to consider such a course for all. In this research, we focus on a typical process safety education course and platform.

A study on past major accidents during the years 1917 to 2011 concludes that the number of major accidents is decreasing in general, which is the result of better enforcement of safety legislation [1]. This shows the importance of strict enforcement of safety laws and regulations. However, this is not the whole story. Other research investigations highlighted the importance of teaching safety for engineering students [2-4].

There are different safety education and training courses developed by different companies; however, each one has different merits, but not necessarily the best for all or the most complete one.

In this project, a safety education platform is proposed to meet the requirements of Industry 4.0 and Skills 4.0. The proposed safety course covers “basic safety concepts”, “historical data of past major accidents and their root causes”, “cultural aspects”, “applicable codes and standards”, “simulation tools”, “automated analysis”, and some case studies all integrated in an appropriate platform. All these could also come in the form of a safety education platform to be more in line with Technology Enhance Learning (TEL) concepts. To show the applicability of the proposed safety education platform, a framework for such a platform together with some examples will be presented.

This project specifically aims at developing a digital twin of process safety engineering and process safety management systems of process plants to provide an active collaborative learning environment based on an industrial platform. In this project collaborating contents, hazard scenarios, worksheets, simulation tools, etc. are integrated using some new technological tools. The developed education platform is based on a web-based open SCADA (Supervisory Control and Data Acquisition) / (Human Machine Interface) HMI Ignition software (which is a powerful environment with everything you need to create virtually any kind of industrial application all integrated in on one platform) integrated with Microsoft SharePoint, and process simulators through OPC (Open Communication Platform) connection. A real operating industrial styrene

polymerization plant was chosen as an example to show the added values and applicability of the developed platform. A brief demo of the developed platform is available at: ([https://www.youtube.com/watch?v=7pmmre\\_7cog](https://www.youtube.com/watch?v=7pmmre_7cog))

## References

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