KAIZEN-2K18, L. D. COLLEGE OF ENGINEERING

12th & 13th April, 2018.

Chemical Engineering Department:

The project fair – 2018 of Chemical Engineering Department as a part of KAIZEN – 2018 was organized on 12th& 13th April, 2018. There were 18 groups of B. E. Final Year students and 12 M. E. Final Year students participated in the event. The projects were displayed in the laboratories of Chemical Engineering Department. The projects of the B.E. and M.E. students were displayed in the form of posters supported by the experimental setups, models and laptops. The projects were evaluated by Prof. (Dr.) Nitin Padhiyar, Professor in Chemical Engineering, IIT, Gandhinagar and Shri. Hemalbhai Sheth, Deedygroup Company.

Principal Prof. (Dr.) G. P. Vadodaria along with media personnel and other dignitaries visited the project displayed by students. They took great interest in the projects and encouraged the faculties and students to take up more research activity in the department. Prof. J. K. Vyas, Head, Industrial Pollution Prevention, Center for Environment Education also visited the department and reviewed the projects. The students enthusiastically presented their project work to the other dignitaries and students who visited the department throughout the day.

The student who visited the event got information about innovation aspects in Chemical engineering field and its importance in today's context. All the dignitaries and students who were present during the event gave a very positive feedback about the event.

Undergraduate Winners Detail

FIRST PRIZE WINNERS

POJECT TITLE: Manufacturing Aspects of Ammonia by Linde Process (20362)

PREPARED BY:

Name	Enrollment No.	Contact No.	Email ID
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GUIDED BY: Prof. R. R. Patel

PROJECT DESCRIPTION:

This project focuses on the study of the Manufacturing process of the Ammonia by Linde Ammonia Concept (LAC). This LAC concept is a novel concept which formulated the process of producing the Hydrogen and Nitrogen (raw materials of ammonia) into separate sections or circuits which eased the overall process and its controllability. This project is based on the study of this process by doing Material Balance, Energy Balance, Proposing Modification(s), and designing the Equipment(s) for the same. As this process is having two separate circuits for the production of the Ammonia, it can be derived that the overall efficiency of the process can be improved by improving the efficiency of either one or both the process circuits. Moreover the process itself is novel and is having a feasible economy but by doing one or two major modifications it can be improved further, above all These modifications are to be tested and verified by Material and Energy Balance which would actually establish that the said modifications are valid and can be incorporated in the existing process.

Modifications

One of the modification that can be proposed is that instead of separating the N2 directly by Air Separation Unit using Air as Raw Material, Air is first purified to produce N2(95 %) in the PSA and then using it as a Raw Material, it can be Purified in ASU thereby reducing the Cold Duty substantially. Moreover Oxygen generation is also reduced drastically hence it removes the handicap of the O2 Consuming Plant needed. Another modification proposed is that the CO2 removal can be accomplished by the countercurrent heat exchange with the Liquid O2 from the ASU thereby limitating the concept of the CO2 removal by Absorption by MDEA.

SECOND PRIZE WINNERS

POJECT TITLE: Manufacturing Aspects of Methanol (20885)

PREPARED BY:

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GUIDED BY: Prof. R.P.Bhatt

PROJECT DESCRIPTION:

We would like to introduce our project which is based on process synthesis of METHANOL.
Steam Reforming of Natural Gas to Synthesis gas and through the Catalytically Conversion of Synthesis gas to Methanol.

Modification:

1) Instead of using Natural Gas as starting material, If we use Shale gas(78% Methane & 16% Ethane too)

That will result in More quantity of Synthesis gas
reduced the Break Even point, so our further production after this new point will result ultimately in more profit.

2) We determined the Maximum (equilibrium) Conversion through Temperature with the help of Thermodynamics.

THIRD PRIZE WINNERS

POJECT TITLE: Manufacturing Aspects of Sulfuric Acid

PREPARED BY:

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GUIDED BY: Prof. S. R. Shah

PROJECT DESCRIPTION:

Sulfuric Acid [7664-93-9], H2SO4, is colorless, viscous liquid having specific gravity of 1.8357 and a normal boiling point of approximately 274°C. Its anhydride, sulfur trioxide [7446-11-9], SO3, is also a liquid, having specific gravity of 1.857 and a normal boiling point of 44.8°C. Sulfuric acid is by far largest produced chemical commodity. Sulfuric acid has many desirable properties that lead to its use in a wide variety of applications, including production of basic chemicals, steel, copper, fertilizers, fibers, plastics, gasoline, explosives, electronic chips, batteries, and pharmaceuticals. It typically is less costly than other acids; it can be readily handled in steel or common alloy at normal commercial concentrations. It is available and readily handled at concentrations > 100 wt % (oleum). Sulfuric acid is a strong acid; it reacts with many organic compounds to produce useful products. Sulfuric acid forms a slightly soluble salt or precipitate with calcium oxide or hydroxide, the least expensive and most readily available base. This is useful property when it comes to disposing of sulfuric acid. Concentrated sulfuric acid is also a good dehydrating agent and under some circumstances it functions as an oxidizing agent.

Modifications Suggested:

- Use of spinning cup atomizers instead of spray nozzles which has advantages like low input sulfur pressure (1:10 bar), smaller droplets, easier flow rate adjustments and shorter furnace.
- Improved techniques of the heat recovery from the reaction by using steam jacketed pipes.
- Improved M.O.C. and advancements in the shape of catalyst which increases the total surface area and reduces pressure drop through catalyst bed.
- Optimized % SO_2 oxidation in catalytic converter.

Post graduate Winners Detail

PROJECT TITLE: Theoretical and Experimental Analysis of Dissolution of Shrinking particle.

PREPARED BY: Juneja Renu A.

GUIDED BY: Dr. S.P.Parikh

Dissolution of non-catalytic particles has many applications in industries like sugar dissolution in food industries, Alum coagulation for water purification, extraction of metals from ores etc. It is important to know the kinetics of dissolution behaviour of amount of solid dissolve with changing volume of liquid, shape of solid, equipment shape and size, time, concentration of bulk, stirring rate and temperature of the system. In literature, very few studies have been found which include fundamental relations of these parameters with final concentration of bulk. This thesis will highlight some of the fundamental finding to model basic parameters in dissolution and theoretical solution of the model. The general model based on extended shrinking film theory has been simulated in MATLAB for different boundary conditions and specific geometry (Slab) of the particle. The simulated results are compared with Alum-water system dissolution experiment. The comparison of theoretical solution of model by simulation with experiment results has been done which validated extended shrinking film model derived by Salmi et al(2016).