Building Operational Excellence in Processing Plants Training Course

Introduction

The success of every company depends of each employee's understanding of the key business components. Employee training and development will unlock the companies' profitability and reliability. When people, processes and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner. Training and development are an investment in future success - give yourself and your employees the keys to success

It is strategically important that your team understands the fundamentals of building operational excellence. This is the difference between being in the best quartile of operational ability and being in the last quartile. There is vast difference in the operational ability of operating companies and most benchmarking studies have confirmed this gap in operational abilities.

Whether you have a team of new or seasoned employees, an introduction or review of these concepts are very beneficial in closing the gap if you are not in the best quartile or maintaining a leadership position. Most studies show that a continuous reinforcement of best practices in operational principles is the most effective way to obtain the desired results. Training and learning should be an ongoing continuous lifelong goal.

Course Objective

This course will guide the participates to develop key concepts and techniques for building operational excellence petroleum refining units. These key concepts can be utilized to make operating and maintenance decisions that can improve your unit's performance.

Many aspects of process plant management can be improved including, product recoveries, purities, energy utilization, cost, quality and safety. This cannot be achieved without first an understanding of basic fundamental principles of these concepts. These principles need to be understood in advance of operating and troubleshooting a process unit for the manager or problem solving to be effective.

This seminar focuses on the core building blocks of the process plant systems, operation, maintenance, equipment and economics. This program will emphasize the process unit operation fundamentals, safe utilization of these fundamentals by operations, engineering, maintenance and support personnel.

Course Duration and Delivery

Typical course duration is 3 to 5 days based on the background of the participates. One of our Senior Technical Professional with over 25 years of experience would lead the class. Instruction can be in house or in an online webinar.

There are many aspects of building operational excellence. Partial list may include;

1. Health, Safety and the Environment
2. Reliability – Continuity of Operations
3. Quality
4. Cost
5. People Development

1. Safety

HSE is the number one concern. No project or operation can be classified as optimized or excellent unless it is done safely (HSE). There are many benchmark studies that show a strong culture of HSE awareness has economic benefits as well as the social and human benefits. Improving your safety comes with an economic cost, but a direct cost benefit of improving your safety is lower insurance rates and improved corporate branding. Many companies with poor HSE records are no longer in business.

A. The health of your employees and neighbors is especially important. Limiting the exposure of hazardous materials is the key to increasing the health of your team.

B. Safety has at least four parts.

1. Construction Safety: This improves over time with the greatest benefit being a reduction in construction deaths.
2. Industrial Safety: Mostly thought of as PPE, ladder safety, etc.
3. Process Safety Management (PSM) as required by OSHA: Great progress has been made in PSM, but many companies still do not meet the minimum requirements published by OSHA.

4. Risk Management: Due to the large number of annual major incidents across the industry limiting risk is critical. KLM Technology Group's senior consultants have a special focus in risk management to assist in this critical area.

C. We live, work, and play on this earth. Moving forward we need to do a better job of preserving the earth. We are improving and polluting less, but we still have work that we can do to reduce our footprint.

2. Reliability - Continuity of Operations

A stable, reliable plant is the largest revenue source. A reliable high-cost plant will generate more revenue than a low-cost plant with multiple outages. The on-stream factor is a benchmark of reliability. Industry average is 97%, but the top quartile approaches 100%. This three percent increased production is a significant difference in revenue.

Operations Group is the first part of reliability.

a. Best in-class operation procedures need to be developed. Of the operational procedures reviewed by KLM Technology Group most would rate as poor and do not meet OSHA minimum standards. OSHA has published typical operating procedures on their web site. Most operation procedures are not as comprehensive as OSHA and many operation procedures reviewed are only a few pages in length.

b. The risk of not developing best in-class operation procedures is poor operator training based on existing substandard procedures. KLM Technology Group can provide senior consultants to assist with building best in-class operating procedures and then assist with operations training.

c. Verifying operation procedures were followed is key. If you have traveled in an airplane you have most likely heard the term “Arm Doors and Cross Check.” The “cross-check” part of this operational procedure is particularly important because it verifies that the doors were armed. There are several ways operating procedures can be verified as followed such as a check list or an independent set of eyes to verify the procedure was followed, like in the airplane.

d. Incorporating any near misses or actual incidents into the operating procedures allows companies to correct errors that were made going forward. Hiding near misses or team management flaws does not fix the issue and prevent future incidents.

Maintenance Group is the second part of operational reliability.

If you survey any group of maintenance managers, they will acknowledge a large percentage of maintenance cost is caused by mis-operation. A way to reduce your maintenance cost is to improve your operations group. Reliability of the Operations Group has a cost, but this cost can be offset by lower maintenance and lower insurance rates.

a. Best in-class maintenance procedures need to be developed. Most of the companies that we have reviewed do not have codified maintenance procedures. Instead they rely on equipment data books as their maintenance procedures. I would rate this as poor and they do not meet OSHA minimum standards.

b. The challenge of not codifying good maintenance procedures it that the maintenance training is based on your existing procedures. Without good procedures one cannot have good technician training. KLM Technology Group can provide senior consultants to assist with building best in-class maintenance procedures and then assist with maintenance training.

c. Verifying procedures were followed is key. If you have traveled in an airplane you have most likely heard the term “Arm Doors and Cross

Check." The "cross-check" part of this procedure is particularly important because it verifies that the doors were armed. There are several ways procedures can be verified as followed such as a check list or an independent set of eyes to verify the procedure was followed, like in the airplane.

d. Incorporating any near misses or actual incidents into the procedures allows companies to correct errors that were made going forward. Hiding near misses or team management flaws does not fix the issue and prevent future incidents.

3. Quality

A company's quality is reflective of external and internal aspects.

a. External aspects: By developing and maintaining the company reputation of producing quality products will allow you to charge a premium during economic up turns and maintain your key customers in a downturn.

b. Internal aspects: There is an added cost of non-quality production. Sometime the product can be reprocessed, with an added energy debit. If the product cannot be reprocessed it will need to be sold with a cost debit.

Most companies have quality audits for the sole purpose of receiving a quality certification. This is certainly a good reason, but a better reason would be to utilize the audit to improve the product quality. Most audit finding are above 90% compliance – amazing – and not true. They are going through the motions of an audit.

If one audited diligently, what would be a reasonable compliance percentage? 75% would probably be a high number, but companies consistently audit above 90%. Many audits are time consuming and unproductive, when in reality they could be made very productive by a rigorous independent audit team.

One of our senior consultants was on a safety audit team. The previous audit team found four noncompliance items. Our team found 40+ noncompliance items that should have been previously identified. This senior consultant thought this was a great audit that made the plant considerably safer. A safety colleague asked me how we were going to deal with the political implications from the stricter audit. The senior consultant replied there should be no political implications, everyone should understand that we made the plant considerably safer.

The political implications were that within three months the senior consultant was no longer on the audit team for that company. If your audit teams are not finding compliance items, they are not really looking therefore you are not allowing your plant to have higher quality or safety.

At one safety audit the senior management team instructed our audit team to do a rigorous audit, which is great and will lead to higher safety, and lower incidents. The audit team found many non-compliant issues

At the end of the audit the senior management team then ask the plant that was being audited what they thought of the audit team. Of course, we were rated poorly by the plant where we just found many non-compliance issues. You can instruct a team to audit rigorously, and when they do it is not required to ask the audited plant what they think of the team – you already know the answer to this question.

If your company is experiencing high rates of incidents, your audit team is potentially laboring under the politically correct method resulting in incidents, higher injuries and insurance cost.

4. Cost

Cost control is a particularly important aspect of operational optimization. The two largest costs are feedstock and energy. An exceedingly small feedstock reduction can lead to a very large profit improvement. A feedstock reduction team should be developed to review feedstock utilization.

In 2002 at Titan Petrochemicals in Malaysia, a feedstock reduction team was able to reduce feedstock cost over USD 10.0 million dollars while increasing production. In 2008 at PT Chandra Asri in Indonesia, a feedstock reduction team a was able to reduce feedstock cost USD 10.0 Million and in 2009 feedstock and energy optimization increased plant margin greater than USD 20.0 million, while increasing production rates.

The industry averages three percent energy improvement per year. The top quartile will improve more than three percent. If you are maintaining your energy usage year after year, you are falling behind. KLM Technology Group can provide senior consultants to review your feedstock and energy utilization. Sometime just the increased focus in feedstock and energy can bring a very large Return on Investment (ROI) from a Process Study.

There is also the timeliness of production. To overproduce and store finished or intermediate products many are not the best use of capital. A supply chain plan can provide cost savings.

5. People Development

Most people might rate this higher than fifth. It is a very important aspect of operational excellent, but talent can be acquired for a price. The best plan is to hire talented people, train them well, pay them well, and retain them, but few companies seem to be capable of accomplishing this task. People Development will insure that items one through four are optimized.

Outline

Introduction to Process Plants

- Overview of the Chemical Processing Industry

Review of Process Incidents

- Safety for the Chemical Processing Industry

Fundamentals of Process Chemistry

- Description of a Hydrocarbon Molecule
- Types of Hydrocarbon Molecules
- Definition and Function of a Catalyst

Introduction to Process Plant Key Concepts

- Unit Operations
- Process Flow Diagrams
- Mass Balance

Introduction to Process Plant Equipment

- Distillation
- Absorption
- Heat Exchange
- Reactors
- Pumps
- Compressors
- Furnaces

Overview of Process Plants

- Introduction to Gas Processing
- Introduction to Refining
- Introduction to Ethylene Plants
- Introduction to Chemical Plants
- Introduction to Hydrotreating

Process Equipment Troubleshooting

- Troubleshooting concepts and techniques
- Typical Problems
- Interaction of Process and Equipment
- Tower Scan Case Study
- Tower Inspection Case Study

Plant Reliability

- Introduction to Plant Reliability
- Equipment Design for improved Reliability
- Benchmarking for Plant Reliability
- Best in Class Procedures
- Best in Class Training
- Incident and Near Miss

Quality

- Introduction to Quality
- Overview of Statistical Process Control

Cost Control

- Introduction to Cost Control
- Feedstock
- Energy
- Develop Key Performance Indicators
- Managing Projects

People Development

- People Development
- Team Building
- Training

Who Should Attend:

- People who are making day to day decisions regarding operation, design, and economics of processing plants;

    1. 1st Line Operations personnel,
    2. Operation Supervisors,
    3. 1st Line Maintenance personnel,
    4. Maintenance Supervisors,
    5. Senior Plant Supervisors,
    6. Operations Engineers
    7. Process Support Engineers,
    8. Design Engineers,
    9. Cost Engineers

- Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding in Processing Plant Operations.

- Other professionals who desire a better understanding of subject matter

What you can expect to gain:

- A detailed overview of process plant operations, processes and economics
- Gain an understanding of process plant equipment
- Gain an understanding of the process plant flow sheets
- Gain an understanding of chemistry and catalyst
- Gain an understating of margins
- Troubleshooting Techniques
- Gain an insight to optimization strategies
- Benchmarking Operations and Maintenance