

Why Process Plant Operator Training Can Fail to Deliver High Performance and Enable Operational Excellence (OpX)

a Hydrocarbon Process Plant Operator Training Report by



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TABLE OF CONTENTS

- Objectives 3
- Introduction 4
- 1.0 Leadership Team Alignment. 5
- 2.0 Shift Supervisor Responsibility. 6
- 3.0 Subject Matter Experts (SMEs). 7
- 4.0 Job Performance Profiles 8
- 5.0 Training Function Management 9
- 6.0 Training System Assessment 10
- 7.0 Training System Design 11
- 8.0 Training System Development 13
- 9.0 Training System Deployment 15
- 10.0 Training Program Evaluation 17
- 11.0 Job Performance Management 18
- Conclusion 20

OBJECTIVES

The objectives of this article are to provide process Corporate Executives and Plant Managers with an understanding of why most Process Plant Operator training programs fail to deliver high performance and enable Operational Excellence (OpX).

INTRODUCTION

Most process Corporate Executives and Plant Managers do not know if their plant's operator training programs are achieving high performance.

In a recent assessment of over 100 process plant training programs, most do not comply with:

- Process Safety Management (PSM) regulations
- AIChE Center for Process Safety and Management (CPSM) guidelines

In addition ninety-five (95) percent of plant operator training programs use unstructured on-the-job training as the major training method.

As a process Corporate Executive or Plant Manager you need to know if your Plant Operator Training System is properly designed, and training is producing the results intended.

This article will provide you with a description of why most plant operator training programs fail to deliver high performance. It will also provide the bases for your company to evaluate your Plant Operator Training System and improve it's effectiveness.

However, many plant training functions are organized, staffed and tasked to just comply with regulatory requirements. This often prevents them from capturing the benefits of a proactive comprehensive Plant Operator Training System.

1.0 LEADERSHIP TEAM ALIGNMENT

Plant Leadership Team Alignment means that the Plant Manager and or his/her direct reports are aligned by a strategic context for the plant. The strategic context includes: Strategic Business Goals, Vision for the Future, Philosophy of Production, and Strategic Improvement Initiatives.

1.1 FINDINGS

In many of the plants assessed, we find that the plant leadership team is not aligned on a vision of the future, or a philosophy of production. Not having plant leadership team alignment creates a silo organization culture that diminishes the strategic context for training excellence. For plant operator training to be effective it must be based on a vision of the future and philosophy of production.

1.2 CAUSES

Not having alignment of the plant's leadership team is caused by a culture that resists change, is focused on obstacles and business as usual.

1.3 BEST PRACTICES

The Plant Manager has aligned the plant leadership team around a vision of the future and philosophy of production.

2.0 SHIFT SUPERVISOR RESPONSIBILITY

The Shift Team Supervisors are those qualified exempt employees who lead the plant operators and manage the production plan for a specific unit or units of plant operations.

2.1 FINDINGS

Shift supervisors are not held accountable for the training and safe job behavior of their operators. Plant operator training and performance is not considered a shift supervisor responsibility.

Shift supervisors are too involved in directing plant operator tasks and moves or performing routine administrative tasks to manage the production plan and coach plant operator performance.

The plant leadership team does not value the position of shift supervisor and is under the belief that the plant operators can work as a self-directed work team. This concept is unsuccessful in most plants.

2.2 CAUSES

The plant leadership team is not aligned on the roles, responsibilities, and competencies of the shift supervisor.

Many plants do not have adequate shift team manning and supervisor to operator ratios.

The plant leadership team does not understand how to optimize point-of-manufacturing safe job behavior.

2.3 BEST PRACTICES

Clearly define the roles, responsibilities, and competencies of the shift supervisor.

Ensure they are responsible and held accountable for the training of their plant operators and management of their performance.

The shift supervisor to plant operator ratio is 1 supervisor to 9 operators.

3.0 SUBJECT MATTER EXPERTS (SMEs)

Subject Matter Experts (SMEs) are exempt, non exempt and union employees who have recognized subject matter expertise in a specific area of production.

3.1 FINDINGS

Plant leadership teams under utilize the expertise of their employees because of a silo culture and traditional thinking.

The plant has not identified employees who are Subject Matter Experts (SMEs) and can serve as technical writers, validators, trainers, and performance coaches.

3.2 CAUSES

The plant leadership team has not embraced a “learning organization” culture where employees across the organization formally share their knowledge as Subject Matter Experts.

3.3 BEST PRACTICES

Employees are identified as Subject Matter Experts (SMEs). As SMEs they share their knowledge by assisting as writers and validators of operating manuals, operating procedures, safe work practices, and training manuals.

In addition, employees who are SMEs and train plant operators are trained and certified as Trainers and Performance Coaches.

4.0 JOB POSITION PROFILES

Job Performance Profiles are documents that describe the roles, responsibilities and competencies of a job position.

4.1 FINDINGS

Most plants do not have a written description of the roles, responsibilities and competencies for the shift supervisor, field equipment operator, and process control operator job positions.

If job descriptions exist, they are usually out of date and not based on the plant's current vision of the future and production philosophy (strategic context).

Training programs that are not based on the plant's vision of the future and philosophy of production and Job Position Profiles are usually not effective.

4.2 CAUSES

For years Plant Managers have resisted documenting the plant operator job positions. They feel it would limit their ability to manage performance.

4.3 BEST PRACTICES

The plant has developed job position profiles for each plant operator positions.

They include:

- Shift Team Supervisor
- Field Equipment Operator
- Process Control Operator

The Profiles are based on the plant leadership team's vision of the future and philosophy of production.

5.0 TRAINING FUNCTION MANAGEMENT

Training Function Management are the employees that are assigned to lead and manage training for the plant or a specific plant function.

5.1 FINDINGS

There is often misalignment between the Plant Training Function and the leadership teams vision of the future and philosophy of production.

5.2 CAUSES

Training is not recognized by the plant leadership team as a keystone to plant asset and human performance excellence.

Training is often viewed by the plant leadership team as regulatory compliance, or something they can not afford to invest in.

5.3 BEST PRACTICES

The Plant Training Function is organized to provide the training required by the plant's vision of the future, philosophy of production, and roles, responsibilities, and competencies described in the Job Performance Profiles.

The Plant Training Function is a lean central function of training experts. However, they use operations, maintenance, and engineering employees as Subject Matter Experts (SMEs) and Trainers to train Plant Operators in the classroom, in skills labs, on simulators and on-the-job.

6.0 TRAINING SYSTEM ASSESSMENT

Training System Assessment is the process of auditing the plant's training needs and the effectiveness of the Plant Training Function to deliver the training to meet the needs.

6.1 FINDINGS

Few plants assess their plant operator training system on a regular bases. As a result the Plant Leadership Team has little empirical evidence on the status of the Plant Operator Training System and its effectiveness.

6.2 CAUSES

The Plant Training Function does not have documented training processes and procedures.

The Plant Leadership Team is not focused on the training process until there is a significant event.

6.3 BEST PRACTICES

The Plant Training Function conducts an annual assessment of the Plant Operator Training System. The assessment focuses on the:

- Management of plant operator training across the plant.
- Training program and course alignment based on the plant's vision of the future and philosophy of production.
- Transference of training into plant operator safe job behaviors.

7.0 TRAINING SYSTEM DESIGN

Training System Design is the process of designing the plant training system(s). It is usually for a specific group of employee positions and include: approach to training, training curriculum, training methods, and training resources requirements.

7.1 FINDINGS

Most plant operator training systems do not provide operators with the essential knowledge and skills required to be a proficient performer in a reasonable time frame. Most are task based and driven by regulatory requirements.

7.2 CAUSES

Most plant operator training programs have been designed by individuals that have little knowledge of instructional design standards.

Most of the programs have been designed to meet the minimum requirements of regulations and industry standards.

7.3 BEST PRACTICES

The plant has a document that describes the Plant Operator Training System. This document describes the approach to training, training curriculum, training methods, and training resource requirements.

The Plant Operator Training System document is a part of the plant's Management of Change system.

The plant leadership team and all other levels of management have a complete understanding of the Plant Operator Training System.

The Plant Operator Training System is designed based on the plant's vision of the future, philosophy of production, and the competency requirements contained in the Job Performance Profiles.

7.3 BEST PRACTICES CONT.

Today's best practice plants design their Plant Operator Training System to include essential knowledge such as equipment operating principles, process operating systems, and process control and automation. The skills not only include how to perform procedure and safe work practice tasks, but root cause analyses, after action reviews, and six sigma.

8.0 TRAINING SYSTEM DEVELOPMENT

Training Program Development is the training process that must be completed to deploy the plant training system. It includes developing and/or purchasing training materials; updating operating procedures and safe work practices; preparing classrooms, skills labs and simulators, and training subject matter experts and trainers, and training supervisors or coordinators.

8.1 FINDINGS

Most plants do not have structured training materials based on their specific unit processes, equipment, instrumentation and controls, and critical job duties.

If training materials do exist they are not developed following standards of instructional design that includes the psychology of learning.

Plant management is under the impression that operating manuals, equipment descriptions, procedures, and safe work practices are adequate training materials.

Employees who serve as trainers often have not been trained and certified as trainers.

There is often a lack of adequate training classrooms and skills labs to conduct the training.

Training budgets are inadequate and not well prepared.

8.2 CAUSES

Plant management and training function managers do not understand the psychology of learning and industrial training.

The development of custom training courseware is expensive and must be kept up to date.

Plant management and training function managers do not understand the differences between performance support documents (operating manuals, equipment descriptions, procedures, safe work practices, etc.) and training courseware (trainer workbooks, visuals, tests, and trainer guides).

8.3 BEST PRACTICES

Plant Operator Training programs are purchased and/or developed based on instructional design best practices. Training program development includes:

- Developing courseware such as training workbooks, visuals, tests and instructor guides.
- Training SMEs to develop the training and performance support material content.
- Training SMEs as Trainers and Performance Coaches.

9.0 TRAINING SYSTEM DEPLOYMENT

Training System Deployment is the process of implementing the actual training programs and related courses. It includes the planning and scheduling of the training, the actual training events, testing and transfer of the training into safe job behaviors.

9.1 FINDINGS

In most plants, the actual training of plant operators is highly unstructured. The plant may have a documented learning management system, but how the actual training takes place varies from unit to unit depending primarily on the front line supervision or experienced plant operators.

The above creates a situation where some plant operators are much better trained than others due to the supervisors and/or operators attitudes.

However, our assessments indicate that most plant operators do not have a mastery of the process systems, they work in and around. Many only understand and can perform routine duties and tasks.

Often this training is only an operating procedure and safe work practices and is task based. In most plants evaluated it is essential process, equipment and controls knowledge is missing.

9.2 CAUSES

Little thought is given by plant management to how new and incumbent Plant Operators will receive the actual training.

There is often conflict between the Training Function Managers and Unit Supervision as to when the training will be scheduled.

The lack of adequate Plant Operator manning in the operating units prevents Plant Operators from receiving formal structured training.

9.3 BEST PRACTICES

The plant has deployed its Plant Operator Training System and it is visible throughout the organization. Deployment includes:

- Shift Supervisors and Plant Operators meeting one-on-one to review the Job Position Profiles (JPPs) and identify competency gaps and/or transfer of training into safe-job behaviors.
- Planning and scheduling classroom skills lab, simulator lab, and on-the-job training.
- Communicating with Shift Supervisors how training is conducted using a combination of classroom, lab, simulators and on-the-job training.
- Training time is built into the Plant Operators 12 or 8 hour rotational shift schedule.

10.0 TRAINING PROGRAM EVALUATION

Training System Evaluation is the process of continuously evaluating the overall effectiveness of the Plant Operator Training System. It includes analyzing employee reaction, learning, behavior transfer to job application, and measurable business results.

10.1 FINDINGS

Many plants do not have a formal process for evaluating the Process Plant Operator Training System.

If training is evaluated, it is at the learning level thru the use of knowledge and performance test at the end of a course versus at the end of module of training. The knowledge tests are not written by individuals trained in the construction of the test. The performance tests are usually unstructured and the administration is usually very informed.

10.2 CAUSES

Plant management does not understand how training must be evaluated and/or is not committed to formal evaluation.

Plant training function managers do not have a written training program evaluation process with procedures and training for content-valid test construction.

Trainers have not been taught how to administer knowledge and performance tests.

10.3 BEST PRACTICES

Each training program is evaluated continuously on four (4) levels. They are:

1. Reaction to the training event.
2. Learning by employees using knowledge and skills testing.
3. Transfer of learning into observable safe job behaviors.
4. Measurable business results such as mechanical availability, yields, energy and mitigation of abnormal events.

11.0 JOB PERFORMANCE MANAGEMENT

Job Performance Management is the system of planning, coaching, and reviewing plant operator performance on a formal bases.

11.1 FINDINGS

Most plants do not have an effective plant operator performance management program.

The job performance of plant operators is not managed.

11.2 CAUSES

Most plants do not evaluate the job performance of their individual plant operators and shift teams.

There is a high degree of variability in the job performance of plant operators and shift teams.

Shift supervisors do not have the same shift rotation as the plant operators they supervise. There is no formal job performance management system.

There are too few shift supervisors to manage and coach plant operator job performance.

Many plants do not have shift supervisors that manage the production plan and lead the performance of plant operators.

Plant management has eliminated the position of the shift supervisor as a means to control operating cost.

Plant management does not understand that effective shift supervisors are the keystone to high plant operator job performance.

Plant management may be under the impression that self-directed plant operator shift teams can manage their own performance.

11.3 BEST PRACTICES

The plant has a formal plant operator Job Performance Management System. Individual plant operator performance is evaluated by the plant operator's shift supervisor using annual performance evaluations, and monthly planned job observations. Rewards are provided for individual operators and shift teams that continuously demonstrate high performance.

CONCLUSION

Research of operational excellence best process plants worldwide indicates that structured Process Plant Operator training, based on the plant's vision of the future and philosophy of production, is a keystone to their success.

Production Excellence, Inc. can assist you in the assessment of your current plant operator training system. For more information visit our website or contact Jack a. Pankoff, Sr. President and CEO, using the information listed below.

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