

Opeyemi Moyegun

QAS 515.41

Operator Error, How to Reduce it or Eliminate it with HFE

4/02/2003

In an industry such as the one I work in, the types of operator error we deal with is minimized because most of the equipment used are computer program type equipment. However, there exist operator errors such as incorrect data entry, incorrect recording on daily production reports and most important of all is an incorrect defect call. These types of errors can be costly and avoiding them or rather minimizing their occurrence is one of the many focuses of the project managers and the office managers at my work place.

My company is one of the few companies in the United States that does Closed Circuits Television Inspection (CCTV) of sewer lines. Our clients want to inspect their sewer systems to find out the conditions of the sewer pipes. In some cases, recommendation of the action to be taken based on the severity of the pipe condition is requested.

To do this we rely solely on software and different programs to convert reports from the field into whatever format the client requests. We also rely a lot on the quality control personnel in the office to review the data and the VHS tapes turned in from the field verifying that the reports are consistent with the video tape recording. This is important because we submit a copy of the VHS tape and a CD along with the report.

Some of the softwares we use mostly are Cobra Information Management System (CIMS), AMPs and WinCan. These softwares enable us to convert the data that the field operators brings back to the office at the end of the day into either a program called Sewer.dat or Sewer 2.dat which ever one the client specified.

Daily, the operator goes to the field with what we call "cyber cards" or "cyber sticks" on which information is recorded.

Each operator has a computer work station in their trucks and when they are ready for inspection, a cyber card or stick is inserted into the computer's hard drive and certain information is manually entered onto the "header screen". The header screen is the first thing that appears on the VHS tape stating information such as; the upstream and downstream manhole numbers, the sewer basin or shed, the street address, the contract name, the client, and any other relevant information. This entry together with

Opeyemi Moyegun

QAS 515.41

Operator Error, How to Reduce it or Eliminate it with HFE

4/02/2003

the observation is recorded on the cyber card or stick, which is what we get at the end of the day in the office.

After entering the required information, the operator is ready to inspect the line section (i.e. going from one manhole to the other, usually from the upstream manhole to the downstream one). A pan and tilt camera mounted onto a robotic machine is descended into the upstream manhole and the operator operates the machine using a hand held control system. There is a monitor in the operator's workstation where he or she is able to view the inspection and upon citing a defect he stops, tilts the camera and shows the defect. Then he/she speaks to call the defect and writes the defect on the screen before continuing with the inspection. Depending on how meticulous the client wants us to be, there might not be any need for stopping to show the defect but this is rarely the case.

To correctly inspect any line section, the operator is required to pay undivided attention to his work in order to avoid a loss of man power and simply a waste of time and money.

Recently, however, this has been happening. There has been a lot of re-televising as a result of incorrect data being submitted by the operator. This is costing the company a lot of money because most of our contracts at the moment are out of state and the company is paying room and board as well as transportation for our field operators. In short, the operators are generating less revenue than they are spending.

The issue is that our client is not satisfied with the reports we are submitting for several reasons. Some of the reasons include an operator calling defects in the pipe incorrectly, entering incorrect information on the header screen, missing defects or rather not calling a defect when one exists, or in some cases recommending that the client take certain action without stating what the problem is. For instance, recommending that a point repair be performed to the pipe without first stating whether or not the pipe is broken, collapsed or cracked.

Some of these errors can be corrected by the quality personnel in the office simply by using video editor to make such correction before the tape is converted to a CD.

However, the others such as not calling defects which are clearly visible, or the

Opeyemi Moyegun

QAS 515.41

Operator Error, How to Reduce it or Eliminate it with HFE

4/02/2003

presence of a root mass (a defect that needs to be cleaned before a pipe can be rehabilitated if that is what the client intends to do) requires going back to the field to re-televisualize that particular line section. In some cases, a particular line section can be re-inspected three different times before the inspection and accompanying reports are acceptable. This situation used to be a rare occurrence but lately it has become a common practice.

After reviewing the situation, we concluded that the operators must be having some problems in the field or are simply misinformed as to what is expected of them on these particular contracts, so this would explain why their production has been very poor for the past three months.

Arrangements were made to ensure that the crew chiefs are provided with all necessary equipments if they needed any as well making provision for extra man power where needed. Project managers were instructed to go by the sites their crews are working in unannounced in order to see how they spend their time and what exactly goes on in the field in an effort to be able to determine what the problem may be.

Also, regarding the possibility of being misinformed; a meeting was held with the crew chiefs and one is scheduled for every Monday morning to review the contract requirements for whatever contract each crew is working on in order to provide clarification on anything that wasn't clear initially and to remind them of what is expected of them on a daily basis as far as production goes. A table was developed which has the daily and weekly quota for each project to increase their awareness. Higher demands were placed on the project managers to get problems corrected in a timely manner therefore eliminating confusion between the office personnel (such as the billing or even the QA department) and the field operators. With all this said and done, production still hasn't improved. This leads us to start considering the possibility that maybe the field guys are stressed, or fatigued as a result of overloading.

Opeyemi Moyegun

QAS 515.41

Operator Error, How to Reduce it or Eliminate it with HFE

4/02/2003

Compared to all the other contracts that we've worked on previously, this contract requires a higher level of accuracy, detail, and professionalism that most of our field employees are not used to or haven't experienced before. This to me has caused a lot of the crew chiefs stress and has hindered their performance. Our failure to provide clear goals has probably contributed to their frustration and stress even more.

In order to attempt to solve this problem keeping in mind the steps that have been take already, I see that working towards redefining the importance of the field operator so that they feel they are a significant part of the process is important. Using the motivation and maintenance theory by Frederick Herzberg we can work on the maintenance factors which he said are conditions that employees expect from their employer and not necessarily factors that will motivate an employee to work harder. For instance, a reasonable level of job security is expected. Since the company has been loosing money lately, a lot our field employees were laid off. This act has probably sent a message to the remaining ones that they are dispensable therefore creating unsatisfied and non committed employees thus the occurrence of mistakes that normally would not have occurred.

To correct this, we will need to incorporate a motivational factor such as recognition for a job well done for each crew that does perform well. Furthermore, we can try as much as possible to provide a reasonable level of security for our field employees. Doing this should boost their work morale which will be beneficial to the company. Also providing them with more knowledge about each contract at the initial stages and not assuming that because they are skilled or experienced professional in this field they know what is expected of them. In addition, since the problem as I perceive it is stress due to overloading, we might need to find a way to assign daily tasks to these operator's in accordance with their individual capacity. Although our main goal is to make money, (i.e. the more an operator can get done in the course of a day the better) but if as a result of not knowing an operator's capability we give him a task that overwhelms him then we lose in the end.

We should also work toward continuous improvement by emphasizing the importance of management's commitment to quality. There has been several meetings where

Opeyemi Moyegun

QAS 515.41

Operator Error, How to Reduce it or Eliminate it with HFE

4/02/2003

everyone was admonished to be on their toes and encourage their subordinates, but the department heads themselves are not entirely committed to see the process through.

So somewhere along the line, the process breaks down and when one person lags, others have to pick up the slack which creates a stifling environment.

I am certain that implementing one or all of these suggestions can help reduce the current problem we are experiencing with our operators and certainly help the company's bottom line.

Reference:

Evans, James R., & Lindsay, William M. (2002) *The Management and Control of Quality* (5th Edition). Ohio: Southern-Western a division of Thomson Learning.

Kroemer, Karl, Kroemer, Henrike, & Kroemer-Elbert, Katrin. (2001) *Ergonomics: How to Design for Ease and Efficiency* (2nd Edition). New Jersey: Prentice Hall.