A root cause analysis (RCA) should be empirical (Barsalou 2016); however, this can be difficult when dealing with a human error. A typical human failure is a missed operation such as when a process step is not carried out. This could mean a part was not installed, a bolt was not tightened, or a server did not delivery a food item that had been ordered.

The simplest answer in such a situation is “the employee forgot.” Perhaps; but there is often more to the situation than simple forgetting and forgetting is not so easy to evaluate empirically. We can’t ask somebody that assembles hundreds of parts a day “Did you forget to tighten a bolt four months ago?” We have only the evidence, in the form of an untightened bolt, and the untestable hypothesis “employee forgot.” Fixating on the untestable hypothesis does little to identify the cause of the problem so that adequate corrective actions can be implemented. This is the point in supplier quality where the supplier often submits and 8D report listing both the root cause “employee forgot” and the corrective action “employee re-trained.” Such actions do little to prevent a reoccurrence of the failure.

Instead, it is better to look at the entire system that lead to the failure. Dr. W. Edwards Deming tells us that 85% of all problems are due to the system and solvable by management only and 15% of problems are due to employees (Walton 1986). Somebody may have forgotten, but how was it possible for one act of forgetting to cause the problem? Is there any way to reduce the chance of somebody forgetting in the future? Investigating to identify the weak points in the process is the first step. Here, a flow chart of the process may be helpful. This flow chart should not be created in a meeting room based on knowledge of the process; the process should be followed and mapped to see how it truly operates. The objective is to identify improvement areas that can prevent the failure form happening again as well as to prevent the failure form escaping if it does occur. This second point is especially important when the only line of defense against an occurrence is hoping nobody forgets.

Every organization has different processes so the actual actions to take will vary. Figure 1 shows a very generic Ishikawa diagram for a missed operation with various items to consider when dealing with such a problem.
Figure 1: Ishikawa diagram for a missed operation

People

A person may have made a mistake, but there could be contributing factors that need to be addressed by the organization’s management. Could fatigue have contributed to the failure? If so, there may not be sufficient break time or breaks may be long enough, but too infrequent. This is especially important if the operation requires intensive concentration for long periods of time.

Is the person even capable for correctly performing the operation? More mistakes could happen if an inexperienced person was never shown how to perform the operation or a person was placed in the job without any form of training in how to perform the task. If one person was untrained, then there is a potential that there are many more so formal employee training and training tracking should be instituted.

Method

Ensure procedures or work instructions are available at the place of work and up to date. Also make sure that they are written in a way that the operator can understand. Technical
instructions written at a graduate school level may not be understandable for a production operator with an eighth grade education. Be sure to determine if the operator is both literate and capable of reading the language used for the work instructions. If not, update the instructions to be of a more graphical nature or translate into the appropriate language.

Are part counters available? If so, were they turned on? If not, perhaps a part counter should be installed. Is there a check to ensure that there are no unused parts left after the operation is completed? This is an indication that there is a part from the last order still around. One simple solution is to ensure that only parts used for the current order are on the work surface.

**Machine**

Is there a Poke Yoke system in place to ensure the machine automatically stopped when a process step is missed (Shingo 1986)? Poke Yoke can removed the need to depend upon people no longer forgetting. Was a Poke Yoke in place, but turned off or removed? One of organization received customer complaints due to mixed parts. The sub-supplier who produced the parts kept reporting that there was nothing more they could do because a divider was in place and production employees still mixed up parts; the root cause was clear after a visit to the sub-supplier’s production floor. All dividers had been removed. During previous complaints, the supplier had not thought to actually check to ensure the dividers were still being used. The problem was being blamed on employees but a simple solution was available.

An operation may be stopped in the middle for the operator to collect the correct tool. Stopping an operation in the middle and a simple “Don’t stop till finished” procedure would be insufficient if the operation can’t continue till the required tool is available. In such a situation all required tools and equipment should be made available in the work area.

**Environment**

Lighting is a typical item on an Ishikawa diagram for people; but it should still be considered. It would be difficult to correctly complete many detailed operations with insufficient lighting so this is an item that should be checked.

Are there loud sounds in the work area? Some people may not be able to concentrate with the constant thump of a machine so noise mitigation efforts or hearing protection may be needed to help employees to concentrate in a loud work area.
Are co-workers interrupting the operator? A machine operator who needs to frequently stop to assist others might not restart an operation at the correct step. If interruptions are unavoidable, it may be necessary to implement a policy require the current operation to be completed before stopping to respond to the interruption.

The temperature in the work area should also be considered. Heating or cooling may be necessary if the work area is too hot or too cold. It can be difficult to perform tasks requiring fine motor skills in a very cold environment and it could be difficult to maintain concentration on an overly hot room.

An employee may also forget to install a part if they are working in a cluttered work area. Parts from various work orders may get mixed up and it will be difficult to notice if there is an extra part left over after an operation. Implementing 5S may be helpful. The work area should be sorted to remove unneeded items, straightened to ensure things are stored in an orderly manner, scrubbed to clean the work area, workstations should be standardized, and self-discipline should be used together with the assistance of a regular cleaning schedule to make sure the work area stays clean and orderly (Barsalou 2014).

**Measurement**

Is there sufficient time available to complete ether operation? Assembly personnel may be expected to move quickly, but is the takt time for the operation too short for the operation to be correctly completed?

**Material**

Was the part delivered to the work area? The employee may have missed the operation because the part was never there in the first place. In such a situation there is the additional failure “part not delivered” in addition to somebody forgetting. Here, the second failure should also be investigated to ensure the proper corrective action is implemented.

**People Make Mistakes, But…**

People do make mistakes, but often the process or organization contributed to the mistake happening. Reminding an employee to “stop forgetting” is not a sufficient corrective action. The organization must investigate the underlying factors which helped to contribute to the failure; otherwise, another employee can be expected to make the same mistake. Asking “Why?” five
times can be helpful here. Where ever possible, Poke Yoke should also be implemented to ensure that failures can’t happen. Such actions are far more effective that telling people to remember to stop forgetting.

References


Root Cause Analysis is often used when something goes wrong, but is also used when it goes well. More on this proactive attitude to problem solving later. Root cause analyses, as well as incident investigations and other forms of problem solving, are fundamentally linked to the following three questions: What is currently the problem? Why does this problem occur? What can be done to prevent this problem from happening again? What is the goal of the Root Cause Analysis? Root Cause Analysis is used as a tool for continuous improvement. If a Root Cause Analysis is used for the first time, it is a Root cause analysis (RCA) is a structured method used to analyze serious adverse events. Initially developed to analyze industrial accidents, RCA is now widely deployed as an error analysis tool in health care. A central tenet of RCA is to identify underlying problems that increase the likelihood of errors while avoiding the trap of focusing on mistakes by individuals. As illustrated by the Swiss cheese model, multiple errors and system flaws often must intersect for a critical incident to reach the patient. Labeling one or even several of these factors as “causes” may place undue emphasis on specific “holes in the cheese” and obscure the overall relationships between different layers and other aspects of system design. RCA (Root cause analysis) is a mechanism of analyzing the defects, to identify its cause. We brainstorm, read and dig the defect to identify whether the defect was due to “testing miss”, “development miss” or was a “requirement or designs miss”. Doing the RCA accurately helps to prevent defects in the later releases or phases.