



SUBJECT	Root Cause Analysis	REV	4-2-10
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I don't like the practice of starting a paper by defining terms, not because it isn't helpful, but because it's so trite - "everybody does it" so goes the adage. Moreover, it's formulaic and devoid of any flavor. It could put the reader to sleep, or worse, before I ever have a chance to hit second gear. But, in case you asked for it, I'll get it out of the way and then we can get on to the really interesting stuff.

Definition of root cause analysis

Effective, systematic methods for figuring out the ultimate source or origin of a problem (the root cause) so it can be eliminated and thus prevent the problem from recurring.

Now lets add some flavor. What did Albert Einstein mean when he said, "doing the same thing over and over again and expecting different results" is the definition of insanity? And what about his observation that, "Perfection of means and confusion of ends seem to characterize our age." I think the great man was referring to the less-than-effective ways we try to solve problems.

- If the horse isn't running fast enough, get a bigger whip.
- If the workforce isn't delivering the results we want, first cajole then threaten them.
- If orders are late, expedite, then expedite some more.
- Blame somebody because everything bad is always somebody's fault.
- "Take a meeting" and come up with a list of "action items": have another meeting and another and another, developing excuses for why the previous action items were not implemented and develop more action items.
- Change enough processes and, surely, the problem will go away.
- But never, never, never (he said with tongue in cheek) take laser-like aim on the result we want and how we can get that result.

It would be handy if we had a single formula for conducting root cause analysis but, alas, there is none. There is general agreement as to what root cause analysis is and how we will know whether or not it worked. On the other hand, there is no clear consensus on how to do it, though many of the practitioners would agree that one of the biggest impediments to solving problems is obsessing on the trees and failing to see the forest. In doing so, we allow ourselves to be head-faked by extraneous details, missing what turns out to be the obvious answer.

If asked to name the most potent "tools" or factors to root cause analysis success I would settle on these three.

1. Analysis
2. Examination
3. Creativity

The Analysis tool most frequently employed is **The 5 Whys**. This brainstorming regimen involves looking at any problem and asking: "Why?" and "What caused this problem?" The idea is simple. By asking the question "Why" you can separate the symptoms from the causes of a problem. This is critical as symptoms often mask the causes of problems.

Often, the answer to the one "why" uncovers another reason and generates another "why." It often takes five "whys" – more or less - to arrive at the root-cause of the problem.



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Let's look at this enlightening case study, called A Variation on the 5 Whys - Old Shep Died.

A wealthy country squire has been away on business. He is met at the train station by his hired hand. On the drive home, the following conversation takes place:

*Farmer(F): Did anything important happen while I was away?  
Hired hand(H): Naw, nothing important...except Ole Shep died.*

*F: (Heartbroken) He was my very favorite dog! How did he die?  
H: He ate a bunch of burned horse meat and died.*

*F: (Angry) Burned horse meat??? Where did he get burned horse meat???  
H: Oh, I forgot about that. See, the barn burned down and the horses were all killed and Shep ate a bunch of burned horse meat and he died.*

*F: (Aghast) How did the barn catch fire???!!!  
H: Sparks. Oh, I forgot about that. See, the house was on fire and the wind blew sparks onto the barn and the barn burned down and the horses were all killed and Shep ate a bunch of burned horsemeat and he died.*

*F: (Disbelieving) How did the house catch fire???  
H: The curtains. See, the wind blew the curtains against the candles, and they caught on fire and the house caught on fire, and the house burned down and the wind blew the sparks onto the barn and the barn burned down and the horses were all killed and Shep ate a bunch of burned horse meat and he died.*

*F: (Dumbfounded) Candles??? We haven't used candles for years! Why were there candles burning in the house???!!!  
H: They were around the coffin.*

*F: (Gob smacked)THE COFFIN!! WHAT COFFIN??!!  
H: Oh, I forgot about that. Your mother-in-law died. I think it was the shock that killed her. And we laid her out with candles around the coffin, and the wind blew the curtains against the candles, and the curtains caught fire and then the house caught fire and the wind blew sparks onto the barn and the barn burned down and the horses were all killed and Shep ate a bunch of burned horse meat and died.*

*F: (Emotionally exhausted) Shock? You said my mother-in-law died of shock?  
H: Oh, I forgot about that. Your wife ran away with a Bible salesman, and the shock killed your mother-in-law and we laid her out with candles all around her and the wind blew the curtains against the candles and the curtains caught fire, and the house burned down and the wind blew sparks onto the barn and the barn burned down and the horses were all killed and Shep ate a bunch of burned horse meat and he died..... but let me think...well, other than that, nothing much happened while you were away.*

Another valuable instrument in the root cause analysis tool bag is Examination, a fact-based rather than opinion-based method of determining root causes where extensive data is collected in order to zero in on the root cause.



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This case study, entitled “*Doctor, Doctor*”, takes place in a physician’s examining room.

*A patient sits on the doctor’s examining table and, touching each part of his own body, complains, “Doctor, Doctor it hurts everywhere I touch. My leg hurts, my arm hurts, my neck hurts, and even my head hurts!”*

*The doctor takes over and with his hands, palpates each of the body areas the patient has just complained about. Each time, he asks, “Does that hurt?” and each time the patient responds, “No”*

*When the examination is completed, the patient asks, “What’s your diagnosis, Doctor? Why does every part of my body hurt when I touch it? What’s wrong with me?”*

*The doctor removes his examining gloves, begins to make annotations in the patient’s chart and informs him, “Your finger is broken!”*

While those case studies shed some light on how you may establish the root cause of a problem, this last one deals with finding the best solution for removing the root cause so the problem does not recur. This case is interesting because, while the root cause was immediately evident, the solution required an understanding of the factors which, while they did not cause it, influenced the problem to the extent that a Creative solution was needed.

This study is called The Wise Custodian

*A middle school in Oregon was faced with a unique problem. A number of girls were beginning to use lipstick and would put it on in the bathroom. That was fine, but after they put on their lipstick they would press their lips to the mirror leaving dozens of little lip prints. Finally the principal decided that something had to be done.*

*She called all the girls to the bathroom and met them there with the custodian. She explained that all these lip prints were causing a major problem for the custodian who had to clean the mirrors every day. To demonstrate how difficult it was to clean the mirrors, she asked the custodian to clean one of the mirrors.*

*He took out a long-handled squeegee, dipped it into the toilet and then cleaned the mirror.*

*Since then there have been no lip prints on the mirror.*

Remembering what Dr. Einstein said about means and end ...“Perfection of means and confusion of ends seem to characterize our age.”...whatever method you use, keep in mind that no root cause analysis is complete unless and until you have verified that the fix has, in fact, eliminated the problem. That’s its end.

Finally, please also understand that while we would like there to be a single, simple causative factor to every problem, except for very simple problems that rarely is the case. So, in addition to heeding Dr. Einstein, let’s keep in mind this warning from H. L. Mencken, “For every complex problem, there is a solution that is simple, neat, and wrong.”

This paper wasn’t intended as a tutorial on root cause analysis – which is pretty obvious I think – but was written to bracket the concept, perhaps demystify it and spur you to learn more about. It truly is a Bottom Line Tool. Whenever you eliminate the cause of a problem you are making a direct contribution to your bottom line. While it doesn’t come free, in my opinion it’s the next best thing to free.



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