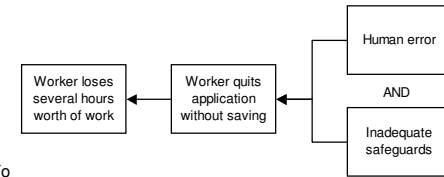


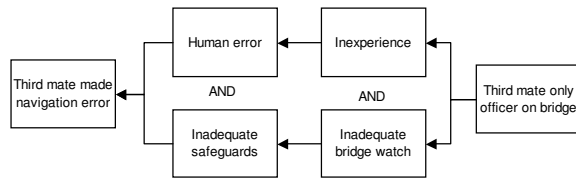
What is "human error"?

There's the obvious definition of "human error": someone just screws up. They *know* they're supposed to do it a certain way, they've been trained, they've done it a *million* times the correct way, and they just do it wrong, this one time. However, there's not really a solution for human error - except to employ only self-programming robots - but our mission when we perform a root cause analysis is to find solutions. So in order to better our process to prevent problems from occurring, we need to branch out from human error and figure out what's really going on.

If one person making a mistake can cause a problem that is either so troublesome or so common that you're performing a root cause analysis, then the safeguards on the process really need to be more robust. So a cause in this case is "human error" but it's also "inadequate safeguards." THAT is a cause that we can do something about. To the right is an example:

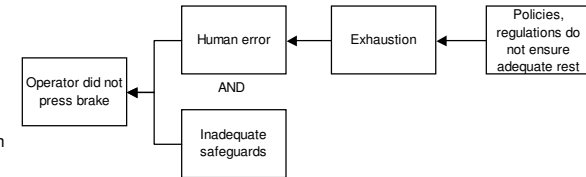


The solution to the map above is why your computer applications ask "Are you sure you want to quit?" when you try to quit without saving.



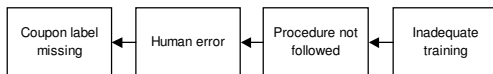
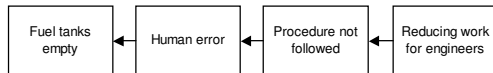
Upgrading your safeguards does not always mean adding additional safety hard- or soft-ware. Sometimes it means backup in the form of additional staff. For example, one of the underlying causes of at least two famous ship collisions was an inexperienced bridge watch. On the bridge of EXXON VALDEZ when it struck Bligh Reef and STOCKHOLM when it hit (and sank) ANDREA DORIA were Third Mates who were not only running the bridge, they were the only officers present. They made some "human errors" with disastrous consequences that would have likely been avoided (or at the very least, mitigated) with someone else there for backup, or a more experienced officer at the wheel.

Another "solution" to human error is regulations and guidelines. Much human error is caused by fatigue or distraction. Another issue on the EXXON VALDEZ was that the Third Mate discussed above had had very little sleep in the days preceding the grounding. When we discover a reason for an operator/worker/driver to be making errors, such as not getting enough sleep or being distracted by collateral duties, we can change our regulations. The National Transportation Safety Board found that Exxon Corporation's policies did not require adequate sleep and in fact encouraged employees to take additional duties that prevented them from getting adequate sleep. There was a collision on the Washington, D.C. metro train system in 2004 where analysis showed that the operator on a train that rolled back into another train did not press the brake. The cause was cited as exhaustion. The operator worked a double shift (8 a.m. to 11 p.m.) the night before, as well as 9 other instances in the previous month. There are no service-hour regulations for train operators, and the Washington Transit Authority policy did not provide adequate time for sleep. A solution to "human error" in both these cases is to adjust policies and regulations to require adequate rest before performing potentially dangerous tasks.



A last consideration when confronted with human error: the problem may not be the procedure but the application of the procedure (i.e. "Procedure not followed"). If the explanation for why a procedure wasn't followed is "everybody does it this way" then the problem is either with the procedure, or with training. For example, ANDREA DORIA (which I mentioned above) was struck by STOCKHOLM and sank. One of the contributing factors was that her fuel tanks (which were required to be filled with water when emptied of fuel for ballast) were empty. So, the tanks on the collision side filled with water and the tanks on the other side provided lopsided buoyancy. The result was a twenty-degree list *five minutes after the collision*. Testimonies stated this was common practice because cleaning seawater out of fuel tanks was an arduous task that engineers would prefer to avoid. So, Captains obliged and ignored the requirement to use fuel tanks as ballast. This was a legitimate concern by the engineers, especially for ships on tight schedules and run for profit. But either these concerns never made it to the right people or they were ignored and the result hastened the fate of ANDREA DORIA. Now, as a result of this accident, ships are required to have separate tanks for ballast.

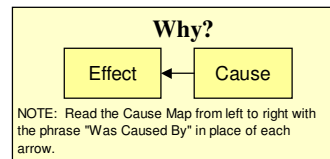
The other side to human error/procedure problems may be inadequate training. A step that is seemingly senseless in a procedure may likely be ignored. If there is a reason for the procedure, it needs to be communicated clearly to all employees. For example, a corporation that made metal sheets for manufacturing labeled the sheets in two places, at one end and at the center of the board. However, the end of the board was cut off and not sent further down the line. So, employees stopped adding the second label. What they didn't know is that the end of the board was sent to metallurgical testing as a coupon sample to verify the heat treatment of the rest of the sheet (which was used for manufacturing). The sheets that had unlabeled coupons were unable to be used without further testing, causing a delay in the line, and possible disposal of material.



Cause Map Detail Level



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The bottom line here is: *Never* stop with human error while performing a root cause analysis. Figure out if there was another cause for the human error and if not, figure out if your organization can live with the potential for another "I just screwed up" human error. If not, you'll need to examine additional safeguards.