

Manual -- QA an Elevator

Scenario: You have to QA a 10 story new elevator. The elevator needs to be available on the opening day of the building in 1 week. Write tests scenarios that you would execute to ensure the elevator is ready to use in time for the release.

Caveat: The 5th floor will have a broken elevator button. What do you do?

Introduction

While I understand the purpose of the exercise, I also understand that my approach to things can sometimes seem excessive to the point of paranoid. I'd prefer "eccentric" though, if I'm honest. Please see the section marked as **Caveat** below to see how I would handle the failures that would come from the 5th floor button inside the elevator not working.

Positive/Happy Path Tests:

- Start by calling the manufacturer, and seeing if there was a way of getting a list of tests to perform on it from their Quality group, in case they have some additional information I should be aware of to perform my testing
- After contacting the manufacturer, I would start my own testing on the main floor and assess the outside of the elevator
 - Interact with each button available from the main floor, making note of how each works, from the panel in the foyer
 - When the elevator arrives each time I push a button, reach inside and push the top floor available, and step back out for it to leave me there
 - Do not enter the elevator to ride until I am confident I know what each button does, making note of any visual or auditory indicator telling the user of the elevator's intentions with its arrival (e.g. a voice saying "going up" or a light illuminating a sign or placard of an up arrow)
 - After feeling confident of what the buttons do, and recording their responses, I would keep these tests handy, as I will be repeating them on every floor the elevator can visit
 - Take the elevator to the second floor, taking note of the process that the elevator takes to achieve this task.
 - Once on the second floor, I would get out of the elevator, and repeat all the tests done on the main floor, sending the elevator to the top floor and repeating button presses and indicators to the user when the elevator arrives.
 - Repeat this going up to the top floor.
 - Once on the top floor, send the elevator to the bottom instead of the top (since it is already there), and repeat the tests.
- After each floor has been assessed, return back to the inside of the elevator and begin my internal assessment

- While my caveat scenario would already cover some of these, I wouldn't necessarily know that going in, so I would still indicate these would be my intentions before showing up for the job.
- Press each button inside the elevator and note what it does, including any fire alarm/emergency buttons that are available.
- If there is a phone or transmitting device, I would use it to confirm it is working.
- If the company wanted to know that the emergency crew handling the phones was good, I might try to do something to cause concern to an operator and see how they respond.
- If keys are used to put the elevator into different modes, I would insist on the user of the keys coming with me for a portion of my tests to confirm that the modes they should set the elevator into are working as they expect them to.
 - While I could ask them for their keys, I would hope they wouldn't hand them over just because I asked for them. It also instills a bit of trust in them from me for future endeavors, if I show them the respect their position demands, instead of erring on the side of convenience in spite of that respect.
- If I could get the emergency service on the call, or someone from the elevator company via a service line, I would ask them to put the elevator into a fire mode, so I could make sure that the elevator does not work in the event there is a fire.
- I would get into the elevator from the bottom floor and ride up to the top, and then back down, and make note of the maximum speed it seems to be getting up to, using clever maths and a stopwatch.
 - We wouldn't want people to break their legs from acceleration/deceleration.
- I would test the functionality of the intention of the elevator. Meaning that if the elevator is in a "Going Up" mode, and somebody selects a floor that is below their current floor, elevators will primarily register the request by lighting up the button, but then removing the lit button to indicate its lack of intention on going there, as it breaks the elevator out of its "counting to 2 by incrementing from 4 and going up" paradox. So I would confirm that the elevator gives a standard indication to someone on the wrong direction-bound elevator that their request is not ready to be processed.
- Along the same lines as the last one, I would press the Up button from one of the floors, and once the elevator arrived, I would press the Down button and board the elevator, pushing no buttons inside the elevator once I enter.
 - After the doors close, I would expect them to immediately open, completing the request for the call to go down. I would take note of its behavior and any visual indicators from within the elevator of what happens.
 - I would then perform the same test, but from outside the elevator, and confirm the indicators match for someone outside of the elevator as someone inside the elevator as to what is happening.
- Lastly, after doing all the functional aspects of the elevator assessment, I would do a graphical assessment, taking note of the aesthetics of the elevator in its place, along with how it is set into different floors, and the innards of the elevator with how the floor, walls, ceiling, and even lighting make the user feel.

- These kinds of assessments would be passed on to probably both a building decorator and the building manager to do with what they want to. Obviously, if there's a strobing light above, or leaking asbestos from the walls, there's further cause for concern, but given that the main obvious things are okay, a little graphical insight wouldn't hurt.
- After all my notes have been taken, and assessments made and sent out for review, depending on my findings, I would take different actions.
 - First, if everything except the 5th floor Caveat went well, and after sending off my assessments to designers and managers, they relayed back that everything looked to be in order, I would await the 5th floor solution to be done, and redo all of my tests to make sure that the problem didn't simply migrate to another floor.
 - I will say that if the engineer tells me they found the issue, and can confirm it isn't an operating system or electrical error, but something small like residue behind the button, a full regression would not be necessary, and only confirming that each button inside the elevator works would be enough to pass it off.
 - Second, if the Caveat was the first of a line of issues, I'd send out my report and get comfortable, knowing I would likely be running through my tests a few more times as fixes and changes are made, or at least discussed.
 - Lastly, if there were things I noticed, but couldn't put my finger on for some odd behaviors, I would report them, but I don't think I would leave. I would likely remain in the building, and spend as much time as I sanely could to try and determine what I feel like I'm missing.
 - If the morning of comes and I haven't found anything, even if I don't feel 100% about it, I would give my final results, and communicate my unease, but that I had no evidence for why I felt that way, and give the thumbsup.jpg to indicate that we're good to go.

Caveat:

- Upon pressing the 5th floor button going from the 4th floor to the 5th floor and not arriving at the 5th floor as intended, I would perform the following troubleshooting:
 - Push the button at different angles and different pressure to see if there is a means that the button will light up
 - See if I can feel a difference from pushing that button in comparison to other buttons (i.e. does it click the same? Require the same pressure? Does it light up but do nothing? Does it not light up at all?)
 - I would go to each of the floors from within the elevator, never leaving, and trying the 5th floor button from each to see if there is a potential programmatic issue with it, and not recognizing the 5th floor if you are coming from the 4th floor specifically.
 - I would then exit the elevator on both the 4th floor and 6th floor, and attempt to gain access to the 5th floor via stairs (which should be present), and try the

buttons from the 5th floor to summon the elevator, noting if the elevator arrives when called to that floor.

- If the elevator does not arrive on that floor, I would consider that to be a major problem. Sure, the fact the number 5 doesn't work is a big problem, but that could be because of a button malfunction and could be the result of someone with residue on their hands pushing in some foreign substance into the button's functional space, rendering it inoperable. However, if the floor itself is not recognized by the elevator, then I would be majorly concerned that some aspect of the elevator's programming or setup has been overlooked. And perhaps the elevator only thinks there are 9 floors instead of 10, which could impact various calculations and reports it sends out to emergency crew and logs for reviewing in case of an accident of what went wrong.
- All things considered, a failure in one part could be something small and petty in nature, but the same failure in multiple systems indicates something much more systemic. Who is to say that the same won't happen to the first floor, rendering the use of the elevator a bit useless if you have to use the stairs to get to it.
- If the elevator does arrive at the 5th floor as requested, I would immediately call the building manager and relay that finding immediately, as the cause for it may be small; but in the case it is something larger like an electrical malfunction, the sooner they get that information, the better.
 - Even though my testing isn't done, I would still report it right away and continue to test

Negative Tests:

- Press all the buttons available at each floor, outside the elevator, and see how the elevator responds
- Stack as much weight into the elevator as I can, weighing each item I put in, and see what happens when I get above the allotted weight limit (most elevators will have a warning well below the actual maximum, and will have sensors that will sound an alarm if the elevator is too heavy, and refuse to move or even close the doors)
- Put in close to maximum capacity weight, and as the doors shut and the room begins to move, cause a sudden shift in weight down to see if I can trick the elevator into thinking it has suddenly gone over its threshold, and note the elevator's response to this sort of action.
- Put something between the door and the negative area that the door slides into and see what the elevator does. Some elevators squawk when you get in the way, and some will actually slowly close regardless of something present. I would force it into this state and see what happens, making note of it.

Security Tests:

- Once inside the elevator I will call the elevator and merely stand within it, not pushing any buttons.
 - The intention here is to assess the elevator's default behavior when it believes there is nobody inside, due to inaction
 - Some elevators will default to a particular floor to wait on, and if I shouldn't have access to that floor at certain times, I would want to see if I can access that floor if I summon the elevator, and remain without acting inside of it for a period of time.
 - After arriving at the desired/targeted floor, I would push the Door Open button to see what it did, and even potentially using the Emergency button to indicate to see if social engineering of the operator would get them to open the door for me to gain access
- Lookup schematics and design of the elevator to determine any sort of access or engineering issues associated with the elevator that I can find out, including support tickets that may be publicly available to potentially use if I need to use the emergency call button. (i.e. if the elevator happens to get stuck a lot when it thinks nobody is inside, that would be good information to have, if I ever need to engineer a scenario that explains why it won't move for me, either to a building specialist, or an emergency call operator).
- Search for button-pushing combinations that are used for this specific elevator's make and model that put the elevator into different administrative modes, and see if any defaults that should have been changed, have actually been changed.
- I would search for the Elevator Control Room, usually in a basement or at the roof, and see if the door is locked. If it isn't, well that's a problem. I wouldn't need to do anything else from there.
 - I might even look up the locks on the door to determine their proficiency at keeping out lockpickers, and raise alarms if they aren't very good reviews. And once I got the assurances that the locks were satisfactory, I would probably get permission to, and attempt to pick the lock myself to set my mind at ease.
- Attempt to open the elevator doors when the elevator is not present at your floor, and see if there's an easy way to gain access without causing damage to any part.

Boundary Tests:

- Not sure what all boundaries there would be for this, that aren't covered in the Negatives or Exploratory tests, but I suppose being in the elevator when the building loses power, and then power is restored would be a good boundary tests to see what the elevator's functions and responses are if it stalls in the middle of a couple floors.

Exploratory Tests:

- Press and hold buttons on the outside of the elevator on each floor, and not let go while I send another person to do the same on a different floor to see what the elevator did.
- Once inside the elevator, hold down as many buttons as I could at the same time, including the Door Open and Door Close buttons, and selecting the floor I was just on as the elevator moves away from it.