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Introduction to Industrial Engineering: Bad Human Factor Designs

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Class Exercise 9: Bad Human Factor Designs**OBJECTIVE**

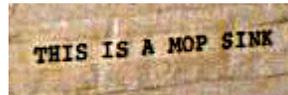
Ergonomics or human factors does not only encompass product design, but safety, and product use. A simple definition is “to make the work place safe and less stressful on the worker.”

As I have told you numerous times in this course, 90% of what an industrial engineer does is common sense (*i.e.*, I think we have a problem here). The 10% that you learn as an industrial engineering major is what to do to solve the problem.

Human factors or ergonomics impacts all aspects of our lives. Let's consider each of the following examples of bad human factor designs. *Note: many of the comments are written in the personal tense (e.g., “I”). “I” refers to Michael J. Darnell, the collector of these examples (<http://www.baddesigns.com/>).*

Example Mop Sink

This picture is from a restaurant in Santa Barbara. There is no urinal in the men's restroom. The fixture in the corner affords a certain activity. To try to discourage this activity someone taped a small sign to the wall above the fixture...



Item 1 Kitchen Timer



This is a nice little kitchen timer unless you want to set a time less than 15 minutes. To do so you must first turn the indicator to a time greater than 15 minutes and then turn it back to the time you actually want! There is no indication of this on the front of the timer. What ends up happening is that you set times less than 15 minutes without first turning the indicator past 15 minutes. Then the timer doesn't go off.

This design violates your expectations by having one rule for setting times greater than 15 minutes (turn the indicator to the desired time) and a different rule for setting times less than 15 minutes (turn the indicator to a time greater than 15 minutes and then to the desired time). A device like this should follow a consistent rule. There is nothing in the appearance of the timer that would lead you to believe that it works like this. This is a nice little kitchen timer unless you want to set a time less than 15 minutes. To do so you must first turn the indicator to a time greater than 15 minutes and then turn it back to the time you actually want! There is no indication of this on the front of the timer. What ends up happening is that you set times less than 15 minutes without first turning the indicator past 15 minutes. Then the timer doesn't go off.

What solutions has the market place made to this simple design?

Item 2 Which Way Does the Model Open?



Can you guess which side of the bar to press to open the middle door? There is no obvious visual indication. If you press on the wrong side (the side with the hinges) it is very difficult to push open. It takes a lot of force.

Based on your experiences of going through thousands of doors, what improvements would your team suggest?

Item 3 What's Wrong With This Intersection?

This is a picture of an intersection that causes people problems. Imagine that you are approaching the intersection in a car. There is a traffic light and you can only turn left or right. Going straight puts you into a parking lot. The lower traffic light has a green arrow that allows you to turn right without stopping.



I've observed a lot of people approaching this intersection with the intention to turn right. They stop at the light and then turn right if they happen to see the green arrow. (They sheepishly look in their rear view mirror to see if anyone noticed that they stopped unnecessarily.) They usually don't see the green arrow until someone honks at them.

Why are people confused?

Item 4 Please Push Slowly



Ever wonder why doors are made out of glass? This picture gives a hint. Imagine that these restaurant doors are both closed and someone tries to leave in a hurry just as someone else tries to enter the restaurant from the outside.

The doors are made of solid wood and are beautiful to look at but you can't see if anyone is standing on the other side.

What improvements would your team propose?

Item 5 Please Push to Start



I'm at a self-serve gas station. I just walked over and handed the attendant a twenty and told him I wanted to fill it. I go back to the pump, put the nozzle in the tank and squeeze the control. Nothing happens. I look at the gas pump for a lever to flip. No lever. I look at the gas pump for instructions or a button or something. I don't see any button. OK, I systematically scan the gas pump, left to right, top to bottom. Nothing. I go back to the attendant. He says "push the button". I say "I don't see any button." He shows me.



It was right in front of me! Why didn't I see it? Part of the problem may have been that I was looking for a "real" button to start the pump; a 3-D button. Whereas the actual button was flat. But probably the bigger problem was that there were so many stickers and decals on the gas pump that finding the start button was like finding a needle in a haystack.

What design improvement would your team propose?

Item 6 Hiding the Radio



This is the center console in a rental car showing how the cup holder is blocking access to the radio and cassette player. Its nice to have a cup holder, but this isn't a very good spot for it. Not only is it hard to use the radio, but if your drink spills, its going into the cassette player!

Does your team think this is a bad product design? If yes, how could it have been avoided?

Item 7

This picture shows a paper towel dispenser in a restroom. The problem is that to get a paper towel to dry your hands, you have to reach into a pile of used towels! The little container that holds the used towels is too small and is just a few inches below the slot where the clean towels come out.

What types of changes have been made?

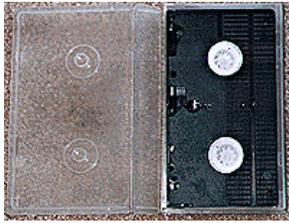
Item 8 **What's Wrong with this Hand Dryer?**

Here is an automatic hand dryer. After washing my hands, I put them underneath the dryer, but nothing happened. I repositioned my hands a few times, but still nothing happened. Next, I pressed the rectangular area on the right (just in case that might turn it on). Nothing happened. Finally, I gave up and dried my hands on my trousers, thinking the dryer was out of order.

Outside, I told my wife that one bad thing about automatic dryers is that it is hard to tell if they are out of order or if you just have your hands in the wrong place. The only way to know you have your hands in the correct place is when the dryer goes on. As it turned out, there was nothing wrong with the dryer. I just had not positioned my hands correctly! My wife told me that you had to put your hands very close to the bottom and towards the back of the dryer.

What is the easiest solution to this problem?

Item 9 Video Rentals



A lot of video rental shops put their videos into these generic plastic boxes. This is to protect the video while it being rented out to people. I have problems putting the video back into the box correctly. The problem is that the videotape spools look like they are in the middle, but they are slightly closer to one edge than the other. And the box has little round protrusions that go into the spools.



The left picture shows the video oriented in the box wrong. That's what I frequently do. As a result, the box won't snap shut because the protrusions don't fit into the videotape spools.



The left picture shows the tape in correctly. Why does the box need those protrusions anyway? If they were removed, the tape could fit into the box four different ways instead of just one. Of course, it would come out of the box four different ways too. That might be problem for the video shop people trying to read the labels on the videotapes.

What design improvements would your team suggest?

Item 10 Please use Sidewalk



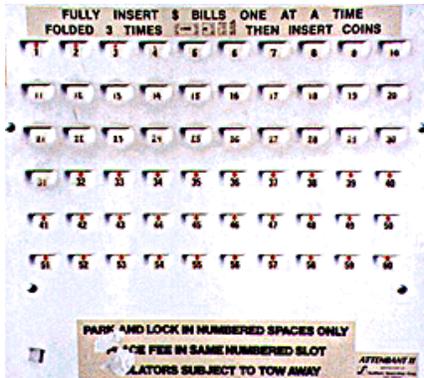
This picture shows a dirt path worn across the grass on a university campus. Notice how the path is in the most convenient place to walk relative to the crosswalk painted on the street and the dip in the curb. It looks like there should be a sidewalk here, but someone forgot to put it in. Instead of putting in a sidewalk, someone put in a sign to try to tell people not to walk on the grass.

Here is a close-up picture of the "Keep off the grass" sign! Do you think this sign is really going to work? Also see "The path of least resistance."



What mistaken assumption does this example demonstrate?

Item 11 Self-Service Parking Attendant



This picture shows a self-service device to pay to park in an unattended parking lot. You need to fold up dollar bills and stuff them "upwards" into the numbered slot corresponding to your parking space. To fit, a dollar bill has to be folded over three times. It isn't easy. Imagine someone with arthritis trying to do this.

Have any members on your team ever used a "box" like this?

Item 12 Stove Top Control



This is the obligatory stove top control example that probably appears in every book on human factors design to illustrate bad design. The problem is that it is difficult to tell which control goes with which burner.

Here is a picture of a good stove top control design following a solution that has been known for years. The solution is to arrange the controls in the same configuration as the burners. It is quite easy to tell which burner goes with which control.



Why do you think all stove tops layouts aren't designed like this one?

Item 13 Don't Go to the Right?



Here is a sign I saw driving down a dirt road at night in Cabo San Lucas, Mexico. I have to admit I really wasn't sure what it meant. Did it mean "Don't go to the right" or "Go to the right, not the left"?

left, go to the right". Confusing?

If the two symbols "do not" and "to the right" are seen as a unit, they might mean "don't go to the right". Alternatively, if they are seen as separate, they might mean "don't go to the

What does your team think this sign is trying to communicate?

Item 14 Men's Room



This sign is on a men's room door at the Houston Museum of Natural Science. I was going to go in, but it seemed that maybe this restroom was for handicapped men only. Just to be sure I watched some guys walk up to the door, look at the sign and then walk away, presumably to go down stairs to the IMAX lobby, like the sign says. Other guys went on in, so I did too. It was a perfectly normal men's room. I don't really know what I was expecting!

What changes would your team make to this sign to improve it?

Item 15 Where Did We Park the Car?



Not long ago we parked our car in a large multi-level parking garage. A nearby sign informed us that the car was parked on level 3 in the Dorothy section. (The garage sections were marked with different Wizard of Oz characters.) Upon returning to the parking garage some time later, we went up to level 3 but didn't see the car. I started to get a terrible feeling that someone took our car. The nearby sign showed level 3 and Dorothy. But then someone noticed that Dorothy was facing backwards on the sign instead of forwards.



We were in the wrong section! We needed to be in the section with Dorothy facing forwards! I bet a lot of people make the same mistake. The problem is that when you note where your car is parked you note just the minimum information you'll need to find your car. So you might just note Dorothy (or girl if you don't know that the girl is Dorothy). Which way Dorothy happens to be facing isn't usually important so you don't notice it. This is especially true if you see Dorothy in a normal orientation.

What are some of your experiences for how parking lots have you remember where you parked your car?