

## HABITUAL EFFECTS IN ELEVATOR

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### ABSTRACT

*The purpose of this research is to know whether a university student's habit when using elevator in Al-Azhar Indonesia University can make a significant influence to its cost or not. One of the method to demonstrate it is to calculate the cost when using the elevator optimally or not. By calculating, it means using one of Power equation, such as the one which needs Current. This research is done within one month period. The result is that the habit can both make an advantage and a disadvantage in a certain condition.*

**Keywords:** habit, elevator, cost, Power, Current.

## 1. INTRODUCTION

### Habit and Technology

A habit is what all living things have in their life, especially humans. A habit is what we call an attitude or behavior that is done over and over. A habit consists of two kinds, good and bad. Humans without exception, are seen living around with these two kinds of habit. To balance a system, the good must be followed by the bad. But what if the bad habit, which we considered as something that can produce problems, started to appear at early age? For example, the teen age.

Habits of teenagers are easily seen in their everyday life as a student or university student, especially when they were using the facilities their school or university provided.

In an era where technology is evolving rapidly, almost every university provided elevator, a vehicle or vertical transportation that used to transport persons or goods. Because no matter what, humans need something that makes them have little work or have not waste any energy, but can produce high benefits.

From the outside, an elevator looks like it is easily lifts a very heavy or light objects up and down against gravity. But is it really not reflected in our mind that the elevator systems which looks very simple can benefit its administrator? Or it turns out otherwise?

Logically, the elevator is not moving by itself. Because in fact, the elevator requires Power in order to move and by using Power means the administrator needs to spend his money because in order to generate Power, money is required.

That is why people can not use the elevator without any second thoughts. That is also why a university student or any other people can not use the elevator like want to go down but go up first because they fetch any elevator that opens first no matter where it's going.

We don't know if what we were doing can make an influence to something like cost and if it really do, we don't know how much it costs. The same goes to the elevator. We don't know how much the elevator system costs its administrator, yet we use it freely as if nothing bad will happen because it has nothing to do with us. It is like an application in your computer that looks very simple to use, but who knows how much virus it keeps inside if you don't look at it deeper?

## 2. THEORETICAL BACKGROUND

An elevator uses a pulley with a pendulum as the other ballast. The other one is the cage of the elevator.

The pendulum is the one who works if the elevator goes up. It will go down to pull the cage.

The elevator is the one who works when it is going down. It will pull the pendulum.

There is also an electric motor that works as Power provider whenever the elevator or the pendulum needs additional Power to lift or lower its weight. But additional Power means additional cost.

The Forces that act on an elevator are usually the Gravitational Force or Weight because the elevator has mass, Tension because the elevator has a cable above it, and Normal Force.

Whenever the elevator's going up, it means the elevator is against the Gravitational Force, meaning the Force is doing a negative work that sometimes in a certain condition needs additional Power other than its own in order to lift its weight. However when the elevator is going down, the Gravitational Force is doing a positive work, meaning that the Force helps to move so the elevator is not using any additional Power. But that doesn't mean the elevator will never use any additional Power whenever it's going down. After all, the Gravitational Force depends on mass.

If the pendulum lifts the cage while the cage's weight is more than half of the limit, the pendulum needs additional Power because of negative work by Gravitational Force. But if its weight below half the limit, it doesn't need any additional Power because the Gravitational Force is not very much work.

If the cage lifts the pendulum while the cage's weight is more than half of the limit, the cage will not need additional Power because the total mass which produces more Gravitational Force is helping the cage goes down. But if the weight is below the half of the limit, the Gravitational Force is not very much helping, thus it needs additional Power to lift the pendulum.

### 3. RESEARCH METHOD

#### 3.1 Time and Place of the Research

This research is done within one month period at working hour, that is from 6th December of 2014 until 6th January of 2015 that takes place in Al-Azhar Indonesia University, Sisingamangaraja Street, Kebayoran Baru, Jakarta Selatan 12110.

#### 3.2 List of Materials

1. Ampere meter clamp
2. Stopwatch
3. Al-Azhar Indonesia University's elevators

#### 3.3 Steps

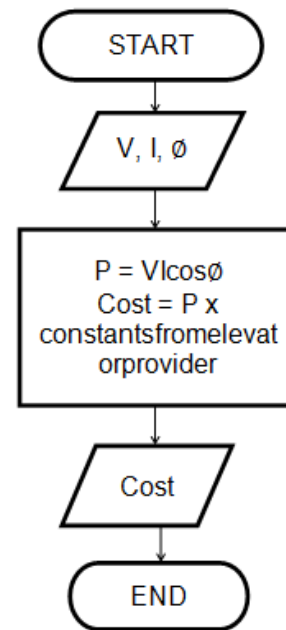


Figure 1. Step of Research

### 4. RESULT AND DISCUSSION

Table 1. The Current when the elevator is going up

Floor	Current Consumption			Duration (s)
	Current per 1 person	Current per 3 people	Current per 9 people	
G	0,5	0,5	0,5	5,0
	2,0	3,8	9,1	10,0
2	0,5	0,5	0,5	5,0
	2,1	2,9	8,6	9,4
3	0,5	0,5	0,5	5,0
	1,4	2,8	8,8	9,8
4	0,5	0,5	0,5	5,0
	1,2	2,1	8,4	9,4
5	0,5	0,5	0,5	5,0
	1,1	1,5	7,1	8,7
6	0,5	0,5	0,5	5,0
	0,9	1,8	6,9	9,1
7	0,5	0,5	0,5	5,0
Avg	0,87	1,42	4,03	7,03
Total				91,3

Table 2. The Current when the elevator is going down

Floor	Current Consumption				Duration (s)
	Current per 1 person	Current per 3 people	Current per 9 people	Current per 10 people	
7	0,5	0,5	0,5	0,5	5,0
	19,3	16,7	7,5	9,3	11,1
6	0,5	0,5	0,5	0,5	5,0
	19,1	16,0	7,6	9,2	9,1
5	0,5	0,5	0,5	0,5	5,0
	20,5	16,1	7,8	9,5	8,3
4	0,5	0,5	0,5	0,5	5,0
	20,5	15,1	7,3	8,5	9,5
3	0,5	0,5	0,5	0,5	5,0
	19,2	15,9	7,6	8,2	9,6
2	0,5	0,5	0,5	0,5	5,0
	18,6	15,1	7,9	8,2	9,0
G	0,5	0,5	0,5	0,5	5,0
Average	9,28	7,57	3,78	4,34	7,04
Total					91,55

4.1 Equation

$$P = V \cos \phi$$

4.2 Cost

To find the cost, it depends on the equation given by the provider of the elevator, because sometimes there is constants to increase the amount of the cost.

In Al-Azhar Indonesia University, there are two conditions to calculate the cost. It depends on time. The conditions are :

1. From 7 A.M until 4 P.M, the equation is constants P multiplied by 735 where P equals 1.3.
2. From 4 P.M until 10 P.M, the equation becomes  $KP735$ , where K equals 1.5.

From the equation, we can calculate average cost consumption and average cost consumption following by university student's habit, and then compare it. By using the same constants for the cost equation, the average cost consumption of the elevator becomes :

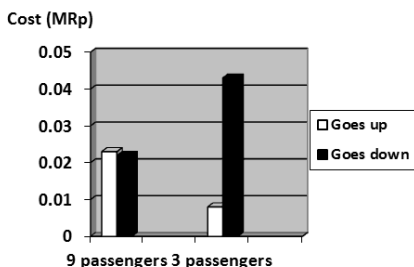


Figure 2. Comparison of two different conditions by assuming that the elevator work 10 times in one hour

By using the same constants as above which means the same work time, and also assume that each person has 0.37 A, the average cost consumption with habit becomes:

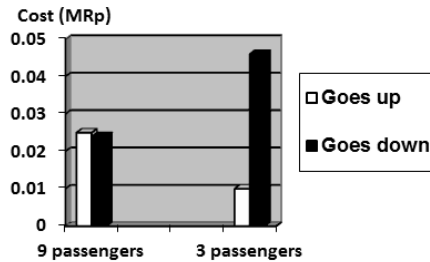


Figure 3. Comparison of two different conditions by assuming the elevator work 10 times in one hour by adding one person with habit

By knowing that more Power means more cost, figure 1 shows that the pendulum when goes up needs more Power whenever lifts a full or almost full elevator which means need more cost, but does not when lifts an elevator with few passengers.

Figure 1 also shows that the elevator when goes down needs more Power whenever lowers the pendulum while having few passengers, but does not while having full or almost full passengers.

Figure 2 actually shows the same term with figure 1. The difference is that there is an additional passenger who acts as the one with habit. We can see that it turned out the person with such habit can make both advantage and disadvantage to the cost because as seen from the graphs, the person only acts as additional factor to the cost but doesnot change the comparison. For one person with such habit, it doesn't show any significant influence for the cost. But when almost every student in the university and even its directors, lecturers, visitors, or employees has the same thought or habit, it will show more influence.

5. CONCLUSION

5.1 Conclusion

The habit is giving advantage to the cost when :

1. The elevator is going up with few (below half of the limit) passengers.
2. The elevator is going down with full (above the limit) passengers.

The habit is giving disadvantage to the cost when :

1. The elevator is going up with full (above the limit) passengers.
2. The elevator is going down with few (below half of the limit) passengers.

### 5.2 suggestion

In connection with the research results that have been obtained, the author wishes to advise readers that:

1. Reader paste a poster on the door of any lift that includes the use of a good Elevator the elevator so that users can see if their intention to wear elevator made a loss or gain for the University. For example an interesting poster is as follows:

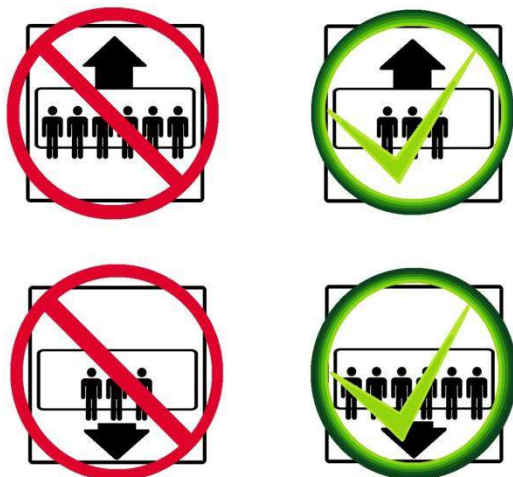


Figure 4. Poster of the use of Elevator

2. The hallway each ladder in University readers made as attractive as possible that could be aided by the creative team of the University or from the field of art, focusing on UKM so that users will be more interested in wearing the lifts stairs to reach the goal of using elevator that is the disadvantage.
3. Improve the lighting of each ladder in Al-Azhar University by adding the number of lights, so that the hallway stairs don't look dark.
4. Pair the alarm in every elevator in accordance with provisions of the adverse conditions and favorable. If passengers are going up the elevator with conditions including harm, an alarm goes off and the elevator will lift will not be covered. That way the students of Al-

azhar will be more disciplined in using the elevator.

5. Change the system of Elevator, with divide the elevator into two lift engines up and down to the floor with a lift and engine also odd rise and fall to the floor even. So all students can use the elevator when go down or up at least 2 floor, if only one floor can make use of the stairs.

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