

Hwa Chong Institution
Project Work
Category 3
Inventions Log Book
(Revised for 2020)

Title of Project:	<u>Flipping Seat</u>
Group Name:	3-23
Group Members:	1)Leow Wei Sheen 2)Triston Tang 3)Vincent Ma 4)N.A.

1. Problem Finding

(The beginning...)

Identify a problem you would like to solve. You may want brainstorm for problems using different approaches eg thematic, survey or general brainstorming etc.

1 A Document a list of problems you have identified. Your documentation should show clearly how your group came up with the problems.

Our Problems:

1. In HDBs, when it rains, many residents are not able to collect the clothes back in time and the clothes might get wet. They might also injure themselves in the process of trying to quickly keep the clothes to prevent it from getting wet.
2. Many Singaporeans love to eat durian, however, the spikey durian shell makes it very hard to open the durian. This might result in cuts on the fingers, causing injury.
3. When the rain is heavy, the strong wind will blow the rain onto the seats at bus stops. This will result in wet seats. Therefore, no one would be able to sit at the bus stop seats.

1 B You should have selected a problem based on some considerations. Identify and justify these considerations.

Our Considerations:

1. An invention that has been inspired by something that we have seen, but has not been made before.
2. An invention that will help as many people as possible.
3. An invention that would be simple to make

1 C List some problems your group would like to solve. List also the considerations for selection of problem in the evaluation grid below. Score the considerations, against the problems, with points 1 (least significant) to 4 (most significant). Sum up the total points for each problem. Identify that problem you would like to solve.

Problem Evaluation Grid

*add more columns and rows where necessary

*highest possible point given: 3

Considerations for Selection	Problems		
	#1	#2	#3
Consideration 1	2	1	3

Consideration 2	2	1	3
Consideration 3	1	3	2
Total Score	5	5	8

2. Define the Problem (This is one...)

Now that the problem has been identified. It is important to gather information on the extent of the problem and/or evaluate the usefulness of existing solutions based on *some criteria*. You may need to conduct surveys and research on existing solutions.

2 A Extent of problem (Research and discuss the problem and write down the problem statement)

After final thoughts, we decided to tackle the problem of wet bus stop seats.

The problem is that many are unable to sit down due to the wet seats. This does not seem like a big problem. However, this situation would occur repeatedly over the years, over the many years that commuters take public transport, which is the main way of getting around our country. Thus, we thought " Why not do something about it?"

In addition, what if the elderly were to take public transport when the seats were wet. They would find it tough to stand and wait for the bus' arrival. What if they were to fall as they were too weak? Thus, we decided to make this flipping seat to get the elderly out of harm's way and for the convenience of other commuters.

2 B Compare and contrast the existing or similar solutions.

One existing solution to solve the problem of wet bus stop seats is the installation of covers at bus stops, although this helps by providing shelter to the bus stop, the strong wind can still blow the rain onto the bus stop seats under the cover.

A similar solution is a picture that we had seen from the internet, this was what inspired us to make this invention. This is a seat that can rotate to allow people to sit on the dry seat at all times. We were inspired by this invention and made our own as we found some flaws with the seat.

1. The weight, the weight of the rotatable seat must be low enough for all people to use it
2. The seat might not be stable due to the roller

*Picture of the seat that inspired our invention:



3. Your BIG IDEA#

(Developing the idea....)

Write down your proposed invention and why you want to do it. State also how you think your proposed invention is better.

3 A Describe your proposed invention.

Our product is a seat which you can turn over to the underside when needed to. The plank that people would sit on will be secured with a bar cutting through it and secured to the frame at two points. This allows the seat to freely turn over, but, There will be another little plank that will be able to slide and is secured to the side of the seat. This will secure the plank that turns and people would be able to sit on it without worrying that the seat will be unstable.

3 B Explain the purpose of your proposed invention and the potential benefits to users.

The purpose is that it will allow people to sit down even if the seats are wet as there is always one side dry. The potential benefit is that it will decrease back pain as people will get to sit down when seats are wet.

3 C In what ways would your proposed invention be different and/or better than existing solutions, if any?

Our invention would be better than existing solutions as it would be cheaper than other existing solutions. Example, the LTA noted bus stop benches cost between \$500 and \$1,500, excluding installation costs. They are expected to last at least 20 years with minimum maintenance. However, our seat will only cost an estimate of \$100 per seat.

3 D What are some problems you expect in the course of your proposed invention?

The problems we expect to face are firstly, gathering the materials needed to build the flipping seat as we wanted the seat to be sturdy and work well. Secondly, the cost of the seat as we did not want the seat to be too expensive as it is unnecessary to spend too much

on a seat. In addition, if the seat were too expensive, no one would spend money to incorporate our idea into Singapore's public transport system.

3 E What and when are the major milestone (project timeline) in your invention?

1. Making of prototype
2. Making of actual invention
3. Testing the invention
4. When the invention works well

#must be able to be constructed based on current / emerging technologies, must not violate the laws of Science or go against the laws of nature.

4. Proposed Construction or Modelling Process*

(This first... then that...)

You are now onto the fabrication of your prototype/ product. You need to select material and understand how to put them together so that your prototype/ product can perform its function.

4 A Explain how and why the materials were chosen for the prototype/ product of your invention

We needed the seat to be light, durable and waterproof as it would be used by everyone from the public, even the disabled and old. The seat should be light to allow even the weaker elderly to use the seat. The seat should also be waterproof as the water on the seat should be able to evaporate and slide off easily. The seat should also be durable as it is meant to last for a long time. Thus, we are using carbon fibre composite, a sturdy and durable material.

4 B Explore these considerations that may guide the construction of your prototype/ product.

It can show how the seat will flip around to change to the dry side. Some of the considerations were using two separate boards like folding seats in the lecture theatre rooms.

4 C Propose how the prototype/ product will be constructed or developed. You may use drawings and photographs.

First, we will collect the materials needed for making the seats. Next, we will start making a sturdy frame and connect the plank where people would sit on to it. Lastly, we will test out the seat and make sure it is safe for everyone to use.

OR

If construction of the prototype is not possible, then you have to create an animation / as a proof of concept that it can be applied in a bigger scale.

4A Explain why construction of a prototype is not possible and the proof of concept is needed in your case.

N.A.

4B Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.

N.A.

Warning:

- *Video / animated simulation only if prototyping is absolutely no possible.*
- *Video / animated simulation must be logical and convincing that the invention works.*
- *Constraints must be clearly included in the logbook or the project will be heavily penalized.*

5. References

Read <http://www.bibme.org/citation-guide/apa/> on how to cite references.

6 A Cite the references you have used for your project work. Your source of reference should come from different types (eg books, magazine, websites, journal articles, interview, photographs, product brochure, reviews etc.)

Image of Inspiration retrieved from:

https://www.google.com/search?q=rotatable+seat&tbm=isch&ved=2ahUKEwiT2eXc2qTrAhU3F7cAHanvA7kQ2-cCegQIABAA&oq=rotatable+seat&gs_lcp=CgNpbWcQAzIGCAAQCBAeMgYIABAIEB46BAgjECdQoApYoxg1yFoAHAAeACAASyIAb8BkgEBNZgBAKABAaoBC2d3cy13aXotaW1nwAEB&sclient=img&ei=e8M7X9OvN7eu3LUPqd-PyAs&bih=722&biw=1536#imgrc=OM4s56C29U1A0M

