



**POLITEKNIK SULTAN SALAHUDDIN ABDUL  
AZIZ SHAH**

**AUTO WATER FILL UP**

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**JABATAN KEJURUTERAAN MEKANIKAL**

**SESI 1 : 2021/2022**

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**Laporan ini dikemukakan kepada Jabatan Kejuruteraan Mekanikal sebagai  
memenuhi sebahagian syarat penganugerahan Diploma Kejuruteraan  
Mekanikal (Pembungkusan)**

**JABATAN KEJURUTERAAN MEKANIKAL**

**SESI 1 : 2021/2022**

**DECLARATION OF AUTHENTICITY  
AND PROPERTY RIGHTS  
AUTO WATER FILL UP**

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Shah Polytechnic, whose address is **Persiaran Usahawan, Seksyen U1, 40150  
Shah Alam, Selangor.** (S).
  
2. I acknowledge that the ‘Project above’ and the intellectual property contained  
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3. I agree to relinquish ownership of the intellectual property of ‘the Project’ to  
‘the Polytechnic’ to meet the requirements for the award of a Diploma in  
Mechanical Engineering (Packaging) to me.

(Made and truly acknowledged)

by the said;

NASHRUL WALIDAIN BIN SAAID

) .....

(IC Number: 010628-08-1483)

) NASHRUL WALIDAIN BIN

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In front of me, GIHA BINTI TARDAN (830506-01-0833)

) .....

As a Project Supervisor on date: .....

) GIHA BINTI TARDAN

## **APPRECIATION**

We were able to complete the final project with excellence within the stipulated period of 6 months without encountering any problems that were difficult to resolve as condition for the awarding of the Diploma in Mechanical Engineering for June 2019 session, thanks to the Divine presence and blessings on our great master, the Prophet Muhammad SAW. We extend our best wishes to all parties involved, directly or indirectly, particularly our supervisor, Mrs Giha Binti Tardan, who has provided us with a great deal of direction, advice, encouragement, and constructive criticism till we complete this final project report. Not to mention the friends and family members that contributed much in terms of perspectives and funds to the completion of this final project assignment. As a result, we are grateful to Allah SWT for completing this final year project. We hope that in the future, this report will serve as an example and guide for all parties involved.

## ABSTRAK

Peralatan mencuci tangan (*Auto Water Fill-up*) dengan metod pengisian air ketangki secara automatik ini direkacipta setelah beberapa pemantauan ke majlis-majlis keramaian yang melibatkan jamuan makan dan pengunjung perlu mencuci tangan sebelum makan. Berdasarkan daripada pemantauan tersebut, antara masalah yang dapat dikenalpasti adalah tempat mencuci tangan yang digunakan dalam majlis tersebut berada pada tempat yang jauh dan tangki pencuci tangan perlu sentiasa diisi dengan air secara manual kerana tetamu yang ramai menggunakan air untuk mencuci tangan dalam satu masa. Ini menyebabkan tetamu berasa tidak selesa dan menjadi kelim-kabut. Oleh yang demikian, satu projek bagi menghaikn peralatan mencuci tangan yang boleh diisi secara automatik telah direkabentuk. Objektif yang telah disasarkan dalam projek ini adalah yang pertama merekabentuk satu peralatan pencuci tangan secara automatik tanpa perlu menambah air kedalam tangki apabila air telah habis dan seterusnya membuat fabrikasi projek fizikal yang dinamakan sebagai *Auto Water Filler Up*. Hasil dari pada rekabentuk yang telah dibuat secara teori dengan kaedah 'gravity filler' dan pelampung air yang berfungsi sebagai pengawal aliran air secara automatik, maka fizikal projek telah berjaya dihasilkan. Data daripada keberkesanan dan kebolegunaan *Auto Water Fill Up* ini juga telah berjaya direkodkan dimana dengan kapasiti tangki air sebesar 10 liter yang digunakan mampu diisi oleh air secara automatik dengan jangka masa 15 minit. Dan tangki air juga akan sentiasa penuh walaupun sentiasa digunakan serta fizikal peralatan yang lebih menarik dan selesa untuk digunakan oleh pengguna untuk mencuci tangan.

**Keywords:** Mencuci tangan, pelampung air, tangki air, dan *gravity filler*

## ABSTRACT

The hand washing equipment (Auto Water Fill-up) with the method of filling the tank water automatically was designed after some monitoring to the crowds that involve banquets and visitors have to wash their hands before eating. Based on the monitoring, among the problems that can be identified is that the hand washing place used in the event is at a remote place and the handwashing tank must always be filled with water manually because many guests use water to wash their hands at one time. This causes guests to feel uncomfortable and become hectic. Therefore, a project to manufacture hand washing equipment that can be filled automatically has been designed. The objective that has been targeted in this project is to design a hand washing equipment automatically without having to add water to the tank when the water has run out and then create a physical project fabrication called Auto Water Filler Up. As a result of the design that has been made theoretically with the method of 'gravity filler' and water buoy that serves as an automatic water flow controller, then the physical of the project has been successfully produced. Data from the effectiveness and usability of Auto Water Fill Up has also been successfully recorded where with a water tank capacity of 10 liters can be filled with water automatically with a period of 15 minutes. And the water tank will also always be full despite constant use as well as physically more attractive and comfortable equipment for users to use for hand washing.

Keywords: *Hand washing, water buoy, water tank, and gravity filler*

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 INTRODUCTION**

It is not too far-fetched to imagine that auto fill up water hand washing product will be highly demanded during outdoor ceremonies if many guests made a lot of complaints for a frequent running out of water in hand wash container. This is because traditional fill up water hand washing needs a lot of work to ready and its process is very slow. To remedy this, our product proposal will ensure users keep their hands clean without any worries and ease the process to fill up water container.

### **1.2 RESEARH BACKGROUND**

A hand washing station is a portable sink that can be used for outdoor events. It can be commuted from any source of water to any occasional event. This station usually features a standard tank for fresh water to wash and need to refill if the tank ran out of water. In short, it keeps our hands clean while not having to leave the party as long as water in the tank is still available.

According to weatherspoon (2020), proper hand washing is the best way to protect ourselves and others from any illness particularly in a public area. Using hand sanitizer is convenient as an option to use when water is not readily available. However, hand sanitizer should not be used regularly because it may make our hands dry and cracked, then, may be more prone to inflection from germs and bacteria. Hence, washing hands properly with running water is necessary. With this background, we come up in mind to fabricate auto fill up water hand washing. This product will keep the tank continuously full of water. With this, the operator also does not have to be hands on work or take more effort to commute top up water tank from source of water to the particular event. Moreover, we want to renovate this hand washing container in built with four wheels so that it can be move easily to anywhere.

### 1.3 PROBLEM STATEMENT

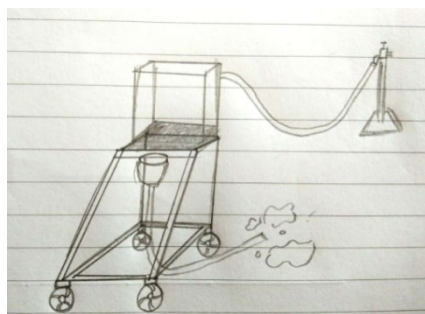
Proper hygiene and an emphasis on keeping our hands clean has always been a critical part of prevention the spread of illness in outdoor activities. In other words, the need of hand wash water container is highly required for people to maintain their hands clean even in outdoor occasion such as festivals, school camps, wedding and etcetera.

However, by using common traditional fill up water system for these outdoor situations, some users might face inconvenience experience such as run out of water in hand wash water container in the meantime to use it. Besides that, these traditional hands wash water container need to be handled manually. A person in charge water needs to open the tap of container before filling up water. Then, fill up water until the container fill of required water.

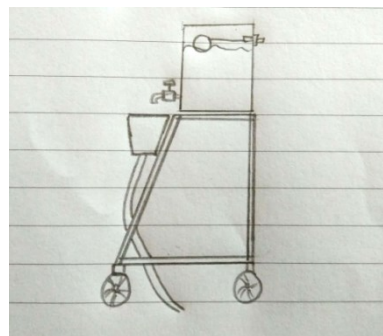
Apart from that, the process of filling water into their old hand wash container is very slow. Generally, a strong man has carry top up water back and forth from the source of water to hand wash container until the container is filled up with water. With this process, it also burdens the carrier of top up water because it requires more energy to lift heavy water container. Lastly, the old hand wash container tends to waste water and not environmental friendly. This is because the top up water might be spilled out during commute and the hand washing water usually came out without proper direction

### 1.4 OBJECTIVE PROJECT

- i. To make suitable designs for the 'AUTO WATER FILL UP' water system.



SKETCH 1



SKETCH 2

- ii. To fabricate 'AUTO WATER FILL UP' water system for handwashing station
- iii. To analyze the sustainability of auto fill up water system in terms of the time taken for filling up water into container and the number of users in one time

## **1.5 RESEARCH QUESTION**

- i. What are suitable designs for the auto water fill up system?
- ii. How to fabricate auto water fill up system for handwashing station?
- iii. How sustainable the auto water fill up system in terms of the time taken for fill up water into container and the number of users in one time

## **1.6 SCOPE OF THE PROJECT**

- i. Auto water fill up can only be sustained within 10 metres from main source of water.
- ii. This product is beneficial for outdoor event organiser. As an example, caterer
- iii. Hand washing containers can only be filled by 45 litres.

## **1.7 THE IMPORTANT OF THE PROJECT**

- i. Easier for workers to handle the water container.
- ii. Save time and manpower to users and employees.
- iii. Help people who often have problems when they want to wash their hands at any events

## **1.8 SUMMARY**

As for this chapter, it is basically discussing on the project draft that would be done. The introduction on how the idea for this project was invented. The project should be the solution for the problems that occurred. Thus, this chapter is focus on creating more ideas for this project currently and for the project's future as well. Overall, this chapter main focus is to direct focus toward the project that would be done including the scope of project and the importance of the project.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

Most of the events required a place for the guests to wash their hands. This project is invented to facilitate the guests to wash hand in a suitable and convenient style of washing hand easier and smoother accordingly. The invented of auto water fill up would be in high demanded by most of the events since we could imagine how exactly the guests would be complaining regarding the uncomfortable place for them to wash their hands. As we know, the conventional style of washing hand required a lot of time and energy from the eventsmanagement which sometimes might cause the container of the wash hand out of water frequently. The conventional style of washing hand need a lot of work to be prepared and process required is very slow and would then cause this type of problems for the events. Basically, the auto water fill up was invented to facilitate any events and ceremonies to make Wsure the events could be on-going smoothly without any problems at the events or thecomplaints made by the guests accordingly.

#### **2.2 COMPREHENSIVE WRITING/ REVIEW/ INVESTIGATION**

##### **2.2.1 GRAVITY FILLER PRNCIPLE**

###### **How it works:**

The gravity filling technique requires a large amount of bulk supply to function properly. The bulk supply would be put into a storage tank located above a series of pneumatically controlled valves, each timed separately. The time length is determined by the filler's master computer. This is owing to the fact that precise liquid quantities may be set up. Due to gravity, it would then pour into the container. This type of filler was created to fill from the bottom up, allowing it to handle a variety of liquids, including foamy materials



**Applications:**

Gravity filler is the type of filler that is best for liquid filling. Because liquids with very thin viscosities are unaffected by changes in ambient temperature or batch size, this is the case. The gravity filler machine is ideal for recirculation applications where liquid in the fluid path is undesirable. Although this type of filler is frequently employed on non-foaming materials, its subsurface or bottom-up fill capabilities may limit and regulate foam.

**Examples:**

Water, solvents, alcohol, specialty chemicals, paint, inks, corrosive chemicals.

**Advantages:**

Gravity fillers are the most cost-effective form of filling machine. This is due to the limited variety of applications that this filler can be used for. As a result, it can also be used to fill explosive compounds.

**2.3 RATIONALE OF PRODUCT**

In any type of event, this product could be valuable for both event organisers and guests. The goal of this device is to make it easier for people to wash their hands at gatherings. Apart from that, it makes the events run more smoothly by removing the need for staff to return and forth to refill the hand wash tank and remove the filthy water from the bucket.

## **2.4 PRODUCT PURPOSES**

The purpose of this literature review is to look at the mechanic system that this product uses. A mechanical system is made up of physical components that convert input motion and force into the desired output motion and force (J.E. Mottershead, 1987). A mechanical system's input, process, and output elements should all be present.

## **2.5 PRODUCT BACKGROUND**

The inspiration for this product came from a public-facing programme, such as a wedding ceremony. The incorporation of mechanic systems into this product is the result of multiple draughts as well as a quick study to help with the work. The product has been filled using gravity filler mechanics. The items or equipment that have been used with a gravity filler usually have a basic design and operation that allows them to operate with a minimal amount of maintenance (NPack, n.d.).

## **2.6 SUMMARY OF CHAPTER**

This chapter is discussing on the filling system that would be applied in the project. The fillingsystem that has been chosen in this project is the gravity filler. The usage of the gravity filler has been discussed in this chapter as well including the rationale, purposes and background of the gravity filling that would be applied in the project accordingly.

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

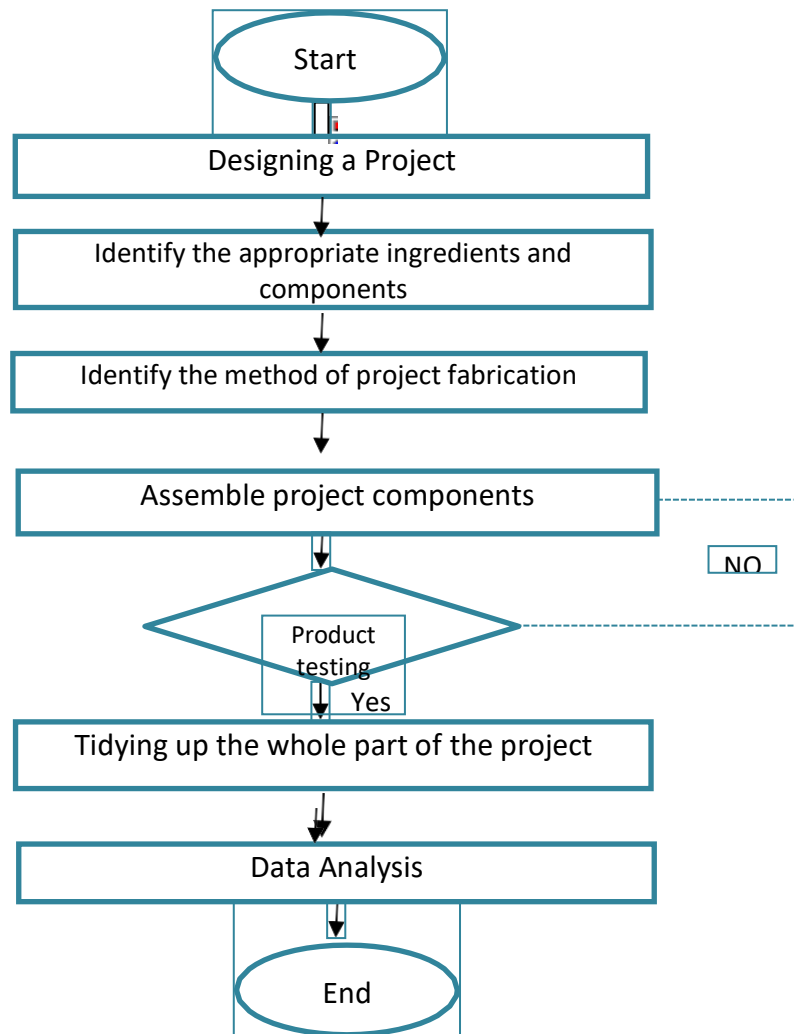
To keep up with current developments, as well as to consider marketing costs and customer loyalty, it's critical to create a good project design. The most important considerations when executing this initiative, on the other hand, are user protection and convenience. There were three steps to achieving the project's objectives:

- i. the design process,
- ii. the assessment process, which includes;
- iii. the fabrication phase and;
- iv. the water fill up to investigate customer satisfaction.

##### **3.1.1 DESIGN PROCESS**

As shown in figure, there are many steps of the production process. The problem is identified using the needs and specifications of the users. The concept design of an auto water fill up was based on gravity filling water and water pump.

### 3.2 FLOWCHART



**Table 3.2:** Project Development Methodology Flowchart

### **3.2.1 PROBLEM STATEMENT**

The purpose of this study is to identify the issues faced by visitors who wash their hands with mineral water since the washing water given is usually insufficient, as well as the issue faced by personnel who have to use a lot of energy to fill water in the washing container hands. As a result, rigorous planning is used to solve the problem by developing Auto Water Fill-Up.

### **3.2.2 ANALYSIS**

The data is gathered, processed, and evaluated so that the following steps may be performed and the study's goals can be met, as a specified in the objectives

### **3.2.3 PROJECT DESIGN**

Before installing an automatic hand washing station, the design was tested to determine the most stable qualities for accommodating the amount of water to be filled in the tank. In fact, this design is developed so that before the project is performed, it can be defined, and even this design will offer more thorough information on how to build a handwashing station with an autonomous system.

### **3.2.4 IMPLEMENTATION**

When a hand washing container is finished, it should be put to the test during a party to see if the float mechanism works correctly when filling the tank with water. The usage of wheels was then used to help with mobility.

### **3.2.5 SYSTEM**

When the Auto Water Fill-Up has reached the intended result, the product will be handed to the catering company so that they may utilize it during the event.

### **3.3 DATA COLLECTION METHOD**

To conduct this research, several data collecting approaches were used to get data that would be useful during the analysis stage. The questionnaire method is one of the data collecting methods. Primary data and secondary data are the two forms of data that may be collected.

#### **3.3.1 PRIMARY DATA**

Primary data are crucial to the research. The study's objectives will not be met until critical data is collected. Respondents were given questionnaire to fill out throughout the data gathering procedure. Employees and visitors were given surveys as a result of this.

#### **3.3.2 SECONDARY DATA**

Literature reviews and others sources such as theses, books in the topic of research, local newspaper, journal, and other publications relating to the study are examples of secondary data. These resources were evaluated for appropriateness and served as the foundation for this research.

### 3.4 PROJECT REVENUE

Here is how to generate *Auto Water Fill Up*:  
(FARIS ZAIM BIN RUSLI)



**Figure 3.4 i.**Manufacture of tank to collect water

**Figure 3.4 i.**demonstrates the first stage in the creation of an Auto Water Fill-up. The container is initially drawn to include holes for attaching a buoy.

(MUHAMMAD KHAIRUL NAJMI BIN AZIZ)



**Figure 3.4 ii:** MIG welding is used to join hollow iron& Grinder to cutting iron

**Figure 3.4. ii).** Legs are made from 1x1 hollow iron with thickness of 1mm.

**(NASHRUL WALIDAIN BIN SAAID)**



**Figure 3.4 iii. Sink**



**Figure 3.4 iv: All part is connected**

**Figure 3.4 vi.** Shown that our project is being connected. With that in mind, our project is complete and ready to be tested and delivered.



### **3.5 DATA ANALYSIS METHOD**

The data that has been collected will be examined, and the findings will be shown in the form of pie charts, bar graphs, and tables during the analysis process.

### **3.6 SUMMARY**

In the first stage, the methodological study creates a systematic research design, data collecting methods, study instruments, data sampling techniques, and data analysis methods to learn the facts information needed to support the study instrument and explain the study more clearly.

After the data has been analyzed, it is necessary to write a summary or draw a conclusion about the findings and hypotheses, such as whether the hand washing station is useful or not.

## **CHAPTER 4**

### **FINDING AND ANALYSIS**

#### **4.1 INTRODUCTION**

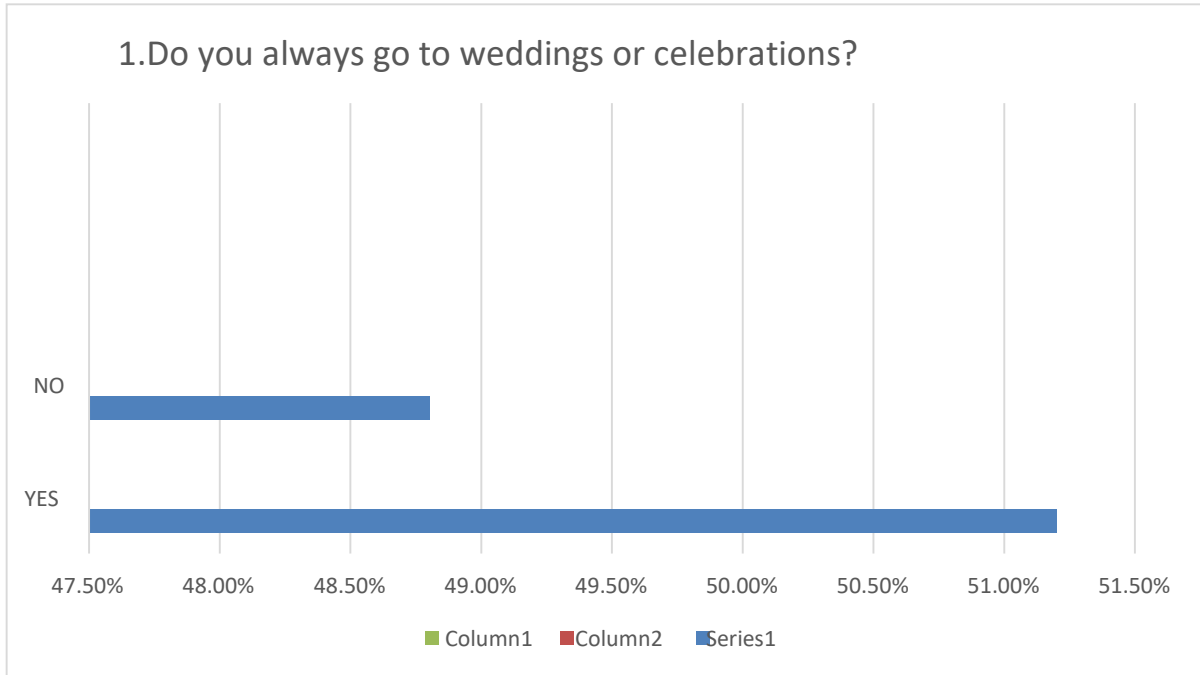
After making some references and surveys, I now get the idea to create or innovate a product that involves the use of the public as well as being able to facilitate one's capabilities. That is, by renewing the hand washing equipment that is in public events or weddings. This made it interesting for me to innovate the tool because the existing hand washing container is very difficult for the workers who operate the container when the water in it runs out. Workers who operate the handwashing container have to fill the water manually and have to go back and forth to fill the water. From there, the employee has wasted his time and man power . Therefore,we plan to innovate it. Next, the overflow of water on the container after people use it is very bad because it makes the place smeared. The mechanism used in our project is gravity filler.

#### **4.2 FINDING AND OUTCOME TEST/ VALIDATION(DATA COLLECTION AND DATA ANALYSIS)**

##### **ASSESSMENT**

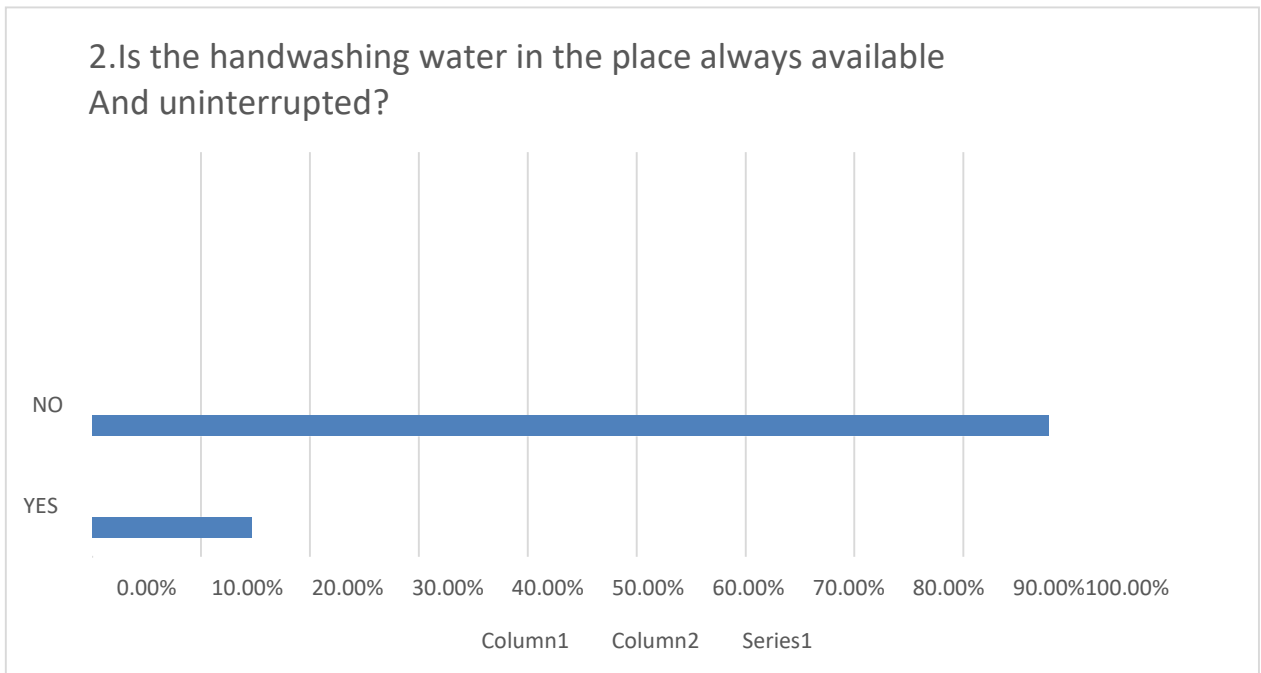
The time required to fill the water into the tank is about 5 minutes. The leg strength of this machine is able to accommodate the weight of 12 gallons of water. The water tank used can be filled as much as 12 Gallons.

### 4.2.1 QUESTIONNAIRE STUDY



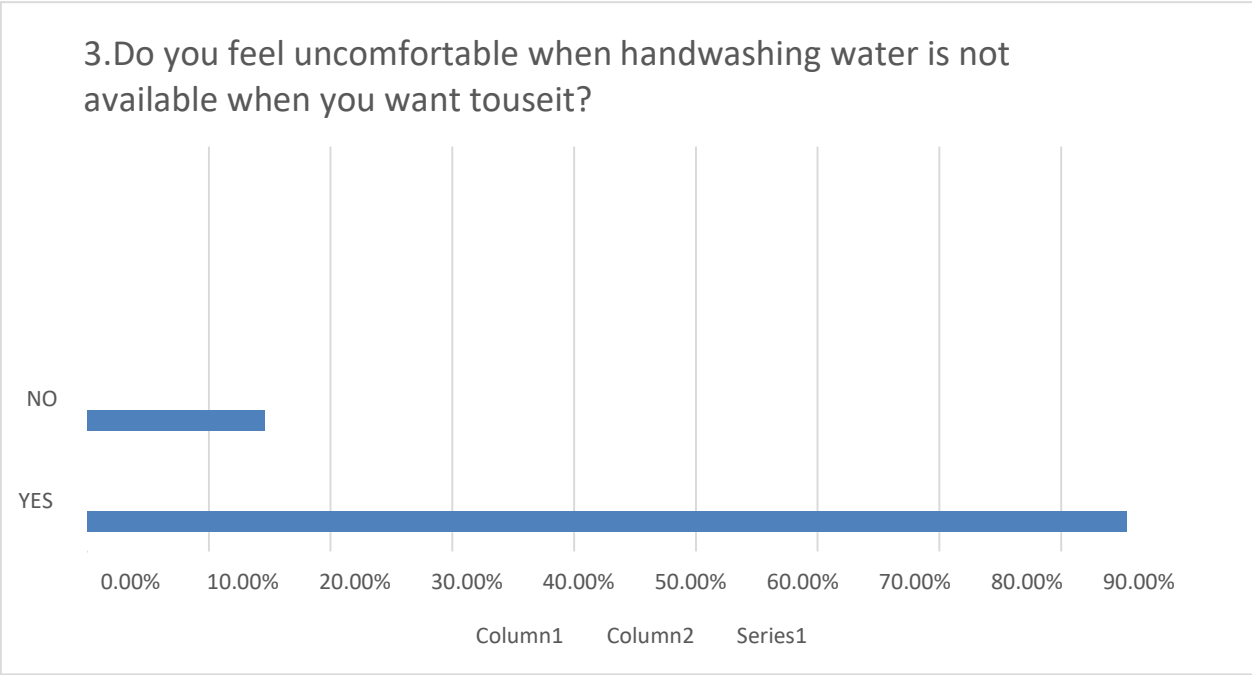
**Figure 4.2.1 i. (Question 1)**

- 51.2% of our respondent always go to wedding or celebrations where this response allow our project to succeed.



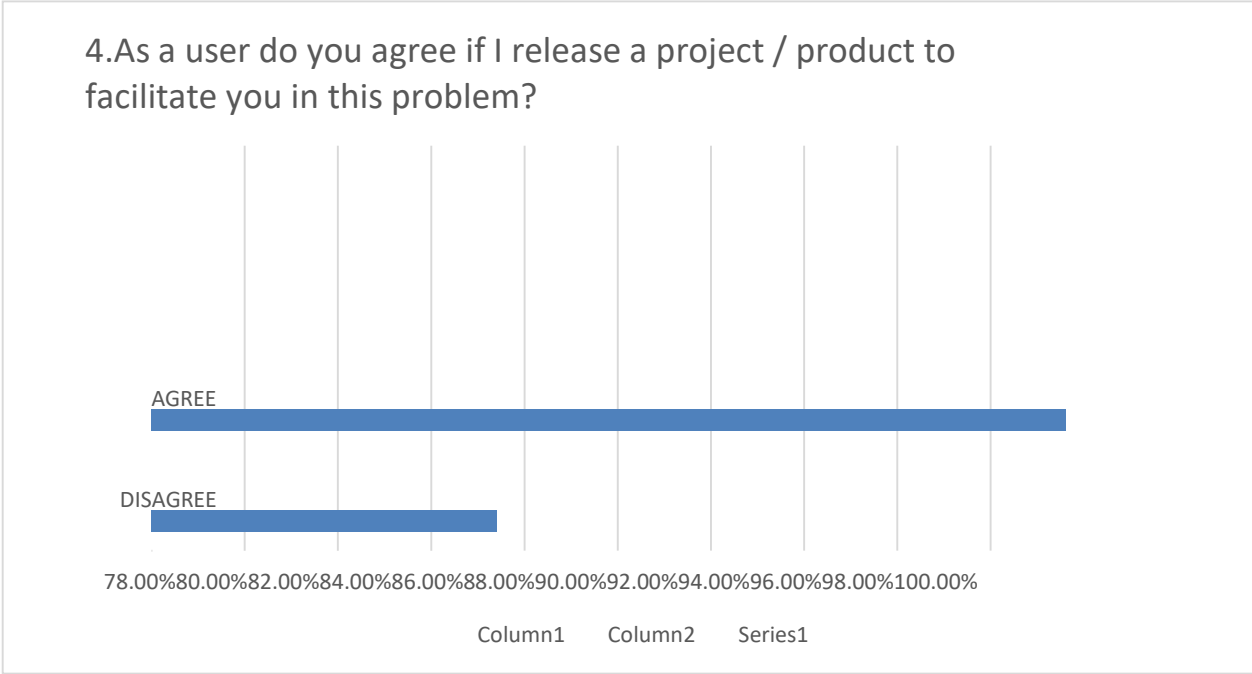
**Figure 4.2.1 ii. (Question 2)**

- 87.8% of our respondents said the truth about hand washing water is always available and uninterrupted.



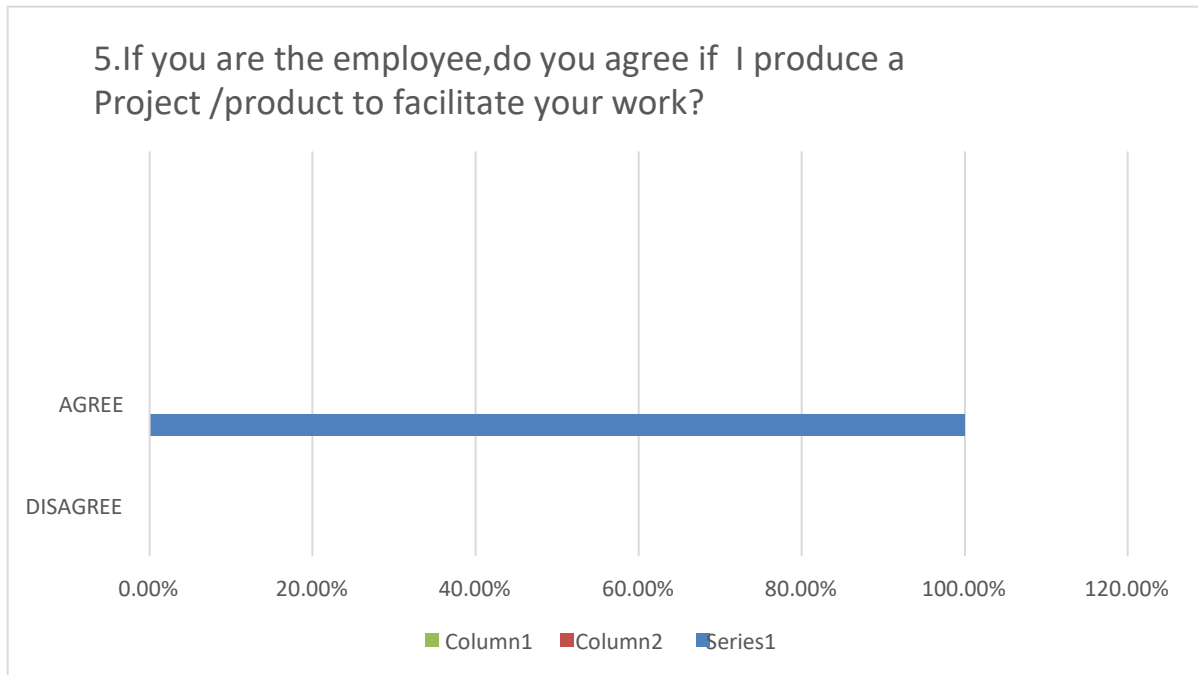
**Figure 4.2.1 iii. (Question 3)**

- 85.4% of our respondents feel less comfortable when there is no handwashing water when they want to use it



**Figure 4.2.1 iv. (Question 4)**

- 7.6% of our respondents agree if we issue a project to facilitate them. This gave us more enthusiasm to continue our project.



**Figure 4.2.1 v. (Question 5)**

- 100% of our respondents agree if we issue a project to facilitate their work. This gave us more enthusiasm to continue our project.

### 4.3 COST COMPONENT

<b>Bil</b>	<b>Bahan</b>	<b>Kuantiti</b>	<b>Harga Seunit (RM)</b>	<b>Jumlah (RM)</b>
1.	Pelampung Air (Injap & Bola Apung PVC)	1	RM8.00	RM8.00
2.	Baldi	1	RM16.00	RM16.00
3.	Paip	10 Meter	RM14.00	RM14.00
4.	Roda	4 Biji	RM6.50	RM26.00
5.	Tangki Air	1	RM20.00	RM20.00
<b>JUMLAH KESELURUHAN</b>				<b>RM84.00</b>

**Table 4.3:** Component cost list

#### 4.4 TESTING RESULT

Number	1	2	3	4	5
Time taken to fill the container with water (minutes)	3	6	9	12	15
Amount of water filled (liters)	2	4	6	8	10

**Table 4.4:** Testing result

It has been found that it takes quite some time to fill the water in the water container, approximately 15 minutes for 10 litres. This is due to the use of water pump valves, low water pressure thus causing the flow of water into the container becomes slow. Meanwhile, the use of water pumps is necessary to avoid waste and can be left unattended.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 INTRODUCTION**

For this chapter, the decisions made are based on all the results obtained from the experiments conducted and the discussions in the previous chapters. In this chapter as well, the relevant matters are related to the objectives of the study as well as the recommendations for the study conducted. In addition, conclusions were drawn for this experiment.

#### **5.2 DISCUSSION**

For Auto Water Fill Up, a test schedule was run throughout the process. The test was done by taking data that is how many minutes the water enters for full. Next, we have also conducted this study and the results are satisfactory.

#### **5.3 CONCLUSION**

Overall, with the AUTO WATER FILL UP, it can make it easier for catering workers without having to go back and forth to fill the water in the water container and save time. In addition, it will also continue to channel dirty water to the drain. The advantage of this AUTO WATER FILL UP is also very useful in large events such as at school, parties and others.

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- [1] <https://www.scopus.com/sourceid/21080>
- [2] <http://www.apacks.com/gravity-filling-machine-principles#:~:text=Gravity%20filling%20is%20the%20simplest,central%20part%20of%20the%20machine.>
- [3] <https://www.npackfillers.com/gravity-filler-work.html#:~:text=Gravity%20filling%20is%20the%20simplest,central%20part%20of%20the%20machine.>
- [4] <https://apexfilling.com/right-filling-machine-principle/>



## **ATTACHMENT**

**ATTACHMENT A**

**Questionnaire**

**ATTACHMENT B**

**Carta Gantt (Projek 1)**

**ATTACHMENT C**

**Carta Gantt ( Projek 2)**



Borang Soal Selidik  
**AUTO WATER FILL UP**

**BAHAGIAN A: DATA DEMOGRAFI RESPONDEN**

ARAHAN : Tandakan(√)padaruang yang disediakan

**1) JANTINA :**

Lelaki ( ) Perempuan ( )

**2) UMUR**

20 hingga 30 tahun ( ) 31 hingga 40 tahun ( )  
41 hingga 50 tahun ( ) 51 tahun keatas ( )

**3) BANGSA**

Melayu ( ) China ( )  
India ( ) Lain-lain ( )

Questions	Answer
Do you always go to weddings or celebrations?	
Is the hand washing water in the place always available and uninterrupted?	
How many time does the operator fill with water in one time?	
Do you feel uncomfortable when hand washing is not available when you want to use it?	
As a user do you agree if I release a project/product to facilitate you into this problem?	
If you are the employee, do you agree if I produce a project/product to facilitate your work?	

## ATTACHMENT B

### Carta Gantt (Projek 1)

MINGGU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AKTIVITI PROJEK															
Pengenalan garispanduan kursus projek															
Membuat penyelidikan tentang projek															
Perbincangan untuk pemilihan projek															
Membuat lukisan projek yang dipilih oleh ahli kumpulan															
Pembentangan lukisan projek															
Keputusan lukisan projek dan tajuk projek															
Membuat proposal projek															
Menyediakan bahan dan komponen projek															
Menyediakan slide presentation															
Pembentangan untuk pemilihan projek															

ATTACHMENT C

Carta Gantt (Projek 2)

Minggu / Aktiviti	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12	M 13	M 14
Pendaftaran Kursus	■													
Menulis Laporan Akhir	■	■	■	■	■	■	■	■	■	■	■	■	■	
Pendaftaran MyIPO		■												
Memasang bahan-bahan dan komponen projek			■	■	■	■								
Ujian produk							■							
Membuat kemasan keseluruhan bahagian projek								■						
Analisa Data									■					
Semakan Plagiat (Turnitin)										■				
Persembahan Kemajuan Projek ( <i>Project Progress Presentation</i> )										■				
Persediaan Pembentangan											■			
Semakan Abstrak oleh penyelia											■			
Semakan Technical Paper oleh penyelia											■			
Pembetulan/Pemurnian Laporan Akhir												■		
Semakan Abstrak oleh Juru Bahasa												■		
PITEX JKM Video, technical paper, poster, Abstrak (selepas semakan)													■	
Penyerahan Laporan Akhir													■	
RICE PSA														■
Penyerahan Logbook														■