



**POLYTECHNIC OF SULTAN SALAHUDDIN
ABDUL AZIZ SHAH**

HAAZ MANUAL CONCRETE MACHINE

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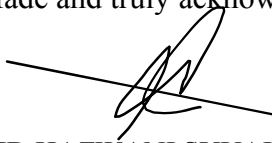
DEPARTMENT OF CIVIL ENGINEERING

SESSION I :2022/2023

DECLARATION OF ORIGINAL AND OWNERSHIP

HAAZ MANUAL CONCRETE MACHINE

1. We are final year student **Muhd Hazwani Syuaib Bin Abdul Ghani (020114-12-0149)** of Diploma in Civil Engineering, Polytechnic Sultan Salahuddin Abdul Aziz Shah.
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3. We agree to transfer ownership of the intellectual property of the 'Project' to Polytechnic Sultan Salahuddin Abdul Aziz Shah to meet the requirements for the award of the Diploma in Civil Engineering to us.
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ACKNOWLEDGMENT

We would like to express our deepest appreciation to all those who provided us with the possibility to carry out this report. A special appreciation and gratitude to our beloved supervisor, Puan Yusnita Binti Yusof for the coordination of this project. On top of that, we would also like to thank her for her encouragement and guidance throughout the process of this final-year project.

Furthermore, we would also like to acknowledge much appreciation of the Semester 4 and Semester 5 students and lecturers of the Civil Engineering Department for giving their best cooperation which is helped us a lot throughout the process of this final-year project.

Finally, we would like to extend our acknowledgment to the Polytechnic Sultan Salahuddin Abdul Aziz Shah (PSA), Shah Alam for providing this opportunity, and our fellow friends and family members for their support as well.

ABSTRACT

HAAZ Manual Concrete Machine is an innovative project from existing self-made concrete machines (DIY). Our products are specially designed for small-scale concrete brewing uses. Furthermore, our product is especially for PSA students who want to carry out the concrete mixing process. One of the first concrete mixers ever developed in 1900 by T.L. Smith in Milwaukee .The methodology of this HAAZ Manual Concrete Machine project will lead to our project to a comprehensive strategy and rationale from our research. This phase will set principles, equipment, materials, and techniques. Plan the project design, and implement project management analysis data, Gantt charts, and flowcharts that will lead to this project successfully. Based on the feedback received through this questionnaire it can be formulated that the use of HAAZ Manual Concrete Machine as an auxiliary tool can positively affect the concrete mixing process. In addition, it helps respondents facilitate and save time during the concrete brewing process. In conclusion, our product, managed to meet all the objectives that have been made. This product is also able to compete in the external market as it is able to reduce time on concrete mixing. The results from the interpretation mean score is high from our respondents questionnaire and hope on this product is that it is necessary to improve the product design to be stronger and the consumer satisfied.

Keywords: concrete machine, design, time

ABSTRAK

Mesin Konkrit Manual HAAZ adalah projek inovatif dari mesin konkrit buatan sendiri (DIY) sedia ada. Produk kami direka khas untuk kegunaan pembuatan bir konkrit berskala kecil. Tambahan pula, produk kami adalah khas untuk pelajar PSA yang ingin menjalankan proses pencampuran konkrit. Salah satu pengadun konkrit pertama yang pernah dibangunkan pada tahun 1900 oleh T.L. Smith di Milwaukee. Metodologi projek Mesin Konkrit Manual HAAZ ini akan membawa kepada projek kami kepada strategi dan rasional yang komprehensif dari penyelidikan kami. Fasa ini akan menetapkan prinsip, peralatan, bahan, dan teknik. Rancang reka bentuk projek, dan laksanakan data analisis pengurusan projek, carta Gantt, dan carta alir yang akan membawa kepada projek ini dengan jayanya. Berdasarkan maklum balas yang diterima melalui soal selidik ini, dapat dirumuskan bahawa penggunaan Mesin Konkrit Manual HAAZ sebagai alat bantu dapat memberi kesan positif kepada proses pencampuran konkrit. Di samping itu, ia membantu responden memudahkan dan menjimatkan masa semasa proses pembuatan konkrit. Kesimpulannya, produk kami, berjaya memenuhi semua objektif yang telah dibuat. Produk ini juga mampu bersaing di pasaran luar kerana ia dapat mengurangkan masa pada pencampuran konkrit. Hasil daripada skor min tafsiran adalah tinggi daripada responden kami soal selidik dan harapan terhadap produk ini adalah perlu untuk meningkatkan reka bentuk produk agar lebih kuat dan pengguna berpuas hati.

Kata kunci: mesin konkrit, reka bentuk, masa

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LIST OF ABBREVIATIONS

DIY	Do-It-Yourself
NP	Neck pain
LBP	Lower back pain
UBP	Upper back pain
H/ULP	Hip / upper legs pain
K/LLP	Knees / lower legs pain
A/FP	Ankles / feet pain
SP	Shoulder pain
E/FP	Elbow / forearms pain
W/HP	Wrist / hands pain
FP	Fingers pain
PP	Palm pain
OPC	Ordinary Portland cement
PSA	Polytechnics sultan Salahuddin abdul aziz shah

SHORT TERMS CONTANT

Symbol

CM	Centre meter
%	Percentage
FREQ	Frequency
l	Litter
KG	Kilogram
MM	Millilitres
RM	Malaysia ringgit

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION OF CONCRETE MACHINE

Concrete Machine is an innovative project from the existing concrete machine that already do-it-yourself (DIY). The innovation comes from the design side and also from the height of the level of the concrete machine. A machine concrete is often called a cement mixer which is a device that homogeneous combines semen, and aggregates such as sand or gravel.

A typical concrete mixer uses a revolving drum to mix the component. For smaller volume work these portable concrete mixers are often used so that the concrete can be made at the construction site, giving the workers ample time to use the concrete before it hardens. The Concrete machine manually or by rotating using a d. It's also called the alternative mixture without using the shovel as a mixture and without using the electronic mixture concrete.

Traditionally, concrete mixtures were prepared manually which consumed a lot of time as well as lacked precision. With growing demand and technological advances, the concrete mixture is now prepared using concrete mixers, even in small-scale applications. Concrete mixers are devices capable of preparing concrete mixtures of varying strength precisely as well as quickly.

1.2 RESEARCH OF THE PROBLEM

Product design is from the wheel where the existing product does not have a wheel which is can make the procedure difficult to be moved from one place to another place especially when the machine concrete is used. Next, the small size of the radius from the holder makes the product little rotation that causes takes a lot of time to be the concrete mixture well. Next, the structure design is not strong enough to accommodate the size of the machine.

Ergonomics is an effect on wealth. The mixture of concrete using a shovel can cause some health complications in back posture. Usually, shoveling involves the weight that needs to bend the body, twist, or move the concrete from one place to another place or that things involve about to carry out loads.

These in the past have found an association between low back pain and factors such as working environment, exposure to physical hazards, and ergonomic hazards such as awkward posture that are many workers who are suffering from low back pain usually continue to other the same job and use the same techniques. this causes the pain to recur, resulting in prolonged sick leave and the condition becoming chronic. (H. Abdul Hadi, 2016).

Shovelling often involves a dangerous combination of heavy lifting, ending tests, and throwing concrete. Injuries associated with sand shovelling Nigeria sand mines 16 location work station Out of a total of 249 responses from 12 different pain descriptions and different levels of pain, those who were above age 24 we mostly affected (59.8%), the majority (56.6%)of which had not spent more than 2years on the current job. (Adeyemi H. Oluwole, 2018).

Table 1.1 Reported health outcome by age and working experience categories participants.

Reported Variables	Total Response	Age Categories (Years)		Working Exp. Categories (Years)	
		≤24	> 24	= 2	> 2
Neck Pain (NP)	5	2	3	2	3
Lower Back Pain (LBP)	52	9	43	16	36
Upper Back Pain (LBP)	13	6	7	5	8
Hip/upper Legs Pain (H/ULP)	31	15	16	17	14
Knees/Lower Legs Pain (K/LLP)	1	1	-	1	-
Ankles/Feet Pain (A/FP)	3	-	3	3	-
Shoulder Pain (SP)	55	19	36	32	23
Elbow/Forearms Pain (E/FP)	10	4	6	6	4
Wrist/Hands Pain (W/HP)	2	1	1	2	-
Fingers Pain (FP)	2	2	-	2	-
Palm Pain (PP)	43	24	19	27	16
Pain at the base of thumb	32	17	15	28	4
TOTAL	249	100	149	141	108
Workers missed work scheduled due to pain in the last one months	48	23	25	17	31

Source: <http://ieomsociety.org/dc2018/papers/4.pdf>

Report of workers self-rated pain severity using a 10-point NRS one-dimensional pain intensity scale with 0 indicating no pain and 10 representing the worst possible pain.

Table 1.2 Summary report of workers' self-rated pain.

Description of Pain	No Pain		Mild Pain (1-3)		Moderate Pain (4-6)		Sever Pain (7-10)	
		%.		%.	Freq.	%.		%.
Low Back	Nil	Nil	4	7.7	32	61.5	16	30.8
Shoulder	Nil	Nil	6	10.9	36	65.5	13	23.6
Palm	Nil	Nil	24	55.8	15	34.9	4	9.3
base of thumb	Nil	Nil	19	59.4	13	40.6	4	12.5
Hip/upper Legs	Nil	Nil	28	90.3	3	9.7	-	-

Source: <http://ieomsociety.org/dc2018/papers/4.pdf>

1.3 OBJECTIVES OF RESEARCH

This research aims to develop an effective machine concrete. this machine could be used to help the workers or the student and the mixture of the concrete with a pro-active. Therefore some objectives have been which will lead to the achievement of this aim project

- i. To produce a product innovation concrete machine.
- ii. To compare the time of mixture between conventional oral innovative machines and to produce workability of concrete conducting slump test.
- iii. To measure the level of satisfaction of respondents with the product.

1.4 SCOPE STUDY

The main material, is a drum barrel, steel, bearing, wheel, rubber, and tray. The size of the drum barrel that will be used is 66cm x 36cm. The optimum liters which we set u in 30-40 liters with an actual maximum is 70 liters to ensure the product works well continuously and is used for a long period. To get 1 round equal 7 spins we will design the project with a radius of the ball of 3cm x handle of radius.

Our project will use a questionnaire concept through the respondents we will show a project video testing that will be used to show to the people who have experience or qualified workers about Field. Our user target is a construction that involves small work and student students the current is user-friendly.

A concrete slump test will be conducted to measure the concrete workability or fluidity. It's an indirect measurement of concrete consistency or stiffness. The shape of the concrete slumps shows information on the workability and quality of concrete. The characteristics of concrete concerning the tendency of segregation can be also judged by making a few tamping or blows by tapping the rod on the base plate.

1.5 THE IMPORTANCE OF RESEARCH

The importance of this product research is the characteristic of the design desire was achieved. Through this research design, we can see that the design framework of the existing product is not able to accommodate the machine in terms of the weight and size of the project which is can make the use of the machine unusable over a long period. With the modification of product innovation, the products of this machine it is able and high loads that are because of the duration of use of the machine over a longer period.

Next, with the advent of this machine can we can seal concrete mixture. Where the use of shovels as concrete mixing will cause an increasing number of health implications, especially for back posture users. As we can see the research that has been accomplished by Proceedings of the International Conference on Industrial Engineering and Operations Management Washington DC, USA, September 27-29, 2018, out a total of 249 responses from 12 different pain descriptions and different levels of pain, those who were above age 24 were most affected (59.8%), the majority (56.6%) of which had not spent more than 2years on the current job.

Last but not least, the concrete machine can reduce the of mixing concrete. Where the use of the machine does not need to mix from one area to another area, it should only be rotated together instead of using the mixed shovel should be done from one area to another area to ensure that the concrete mixture is completely mixed.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

A concrete mixer often colloquially called a cement mixer is a device that homogeneously combines cement, aggregate such as sand or gravel, and water to form concrete. A typical concrete mixer uses a revolving drum to mix the components. For smaller volume works, portable concrete mixers are often used to make concrete at the construction site, giving the workers ample time to use it before it hardens. Usually, it's done in a wheelbarrow; however, several companies have recently begun to sell modified tarps for this purpose. The concrete mixer was invented by Columbus, Ohio industrialist Gebhardt Jaeger.

One of the first concrete mixers ever was developed in 1900 by T.L. Smith in Milwaukee. The mixer already exhibited the still common basic construction with a tiltable conical drum as a double cone at that time with blades. 1925, at least two mixers, were built 25 years ago. The Smith Mascot in essence has the same construction as the small mixers used today.

In the 1920s, the T.L. Smith Company in Milwaukee built the world's largest concrete mixers. Mixers of this company were used for the construction of the Wilson Dam, the first stadium of the Ohio State University and the Exchequer Dam. (T. L. Smith Company c.1927).

2.2 CONCRETE

Concrete is a composite material that is useful to be applied to various building works in the construction field. The main ingredients of concrete are cement, aggregate, and water. For ordinary cases, ordinary Portland cement (OPC) is usually the type of cement used in the formation of concrete.

This type of cement is widely regarded as one of the most ground-breaking technological products that are ever invented by humans in history (Shi, Jiménez and Palomo, 2011).

Concrete has good strength in terms of compressive, stiffness, and durability. But in tension, concrete is brittle and weak. Plain concrete has pros and cons but in term of cons from two flaws which is low tensile strength and low strain at fracture (Srinivasa Rao et al., 2010.).

Table 2.1 The amount of cement, sand, and water that are required for a different grade of concrete.

Amount of Cement, Sand, and Water Required for Different grade of concrete				
Mix	Ratio	Cement in Kgs	Sand in Kgs	Water in Litres
M5	1:5:10	141.00	785.00	70.50
M7.5	1:4:8	174.00	773.00	87.00
M10	1:3:6	226.00	753.60	113.00
M15	1:2:4	322.00	717.80	161.00
M20	1:1.5:3	403.20	672.00	201.60
M25	1:1:2	565.00	565.00	282.50
M30	1:1:3	452.00	452.00	226.00

Above Values are approximate and may be Change according to temperature

Source: www.civilconcept.com

2.2.1 CEMENT

Cement quality plays a vital part in contributing to the compressive strength of the concrete cast. It is also known as the binder of the concrete mixture. The properties of the cement have a major impact on the final presentation of the concrete formed as part of the strength quality of the sample derived from the cement paste.

The degradation course experienced by the concrete is governed by the characteristics of the toughened blend of cement. Researches prove that the period when the cement paste undergoes maturity and change in its configuration, as well as the arrangement of pores, determines whether the final product will go through any reduction in its strength properties in a complex manner (Janotka and Nürnbergerová, 2005). Therefore, considerations have to be made on the selection of quality cement as well as the conditions while mixing it with aggregate and water.

2.2.2 AGGREGATE

Aggregate is a very critical element in forming the compressive strength of concrete. For instance, the size, shape, and texture of the aggregate are both key factors to focus on. The strength assessment of concrete and the design carried out on the quality concrete mix are largely influenced by the shape feature of the selected aggregate. Crumbling and lengthened aggregate particles possess a greater specific surface area. This quality is extremely effective in producing a cement mixture that is associated with greater demand (Molugaram, Shanker, and Ramesh, 2014).

While conducting studies on coarse aggregate, it is mentioned that the favorable percentage of coarse aggregate content that gives the casted concrete with high strength values is in the range between 36% and 40%. It is disadvantageous if the concrete contains coarse aggregate content that is higher than 40% as it can decrease the concrete strength (Cetin and Carrasquillo, 1998). Besides, an experiment proves that the increase of fine aggregate supply efforts in the formation of concrete with higher compressive strength is due to the nature of fine aggregate as a noteworthy strengthening element, particularly in lean mixtures (Kronlöf, 1994).

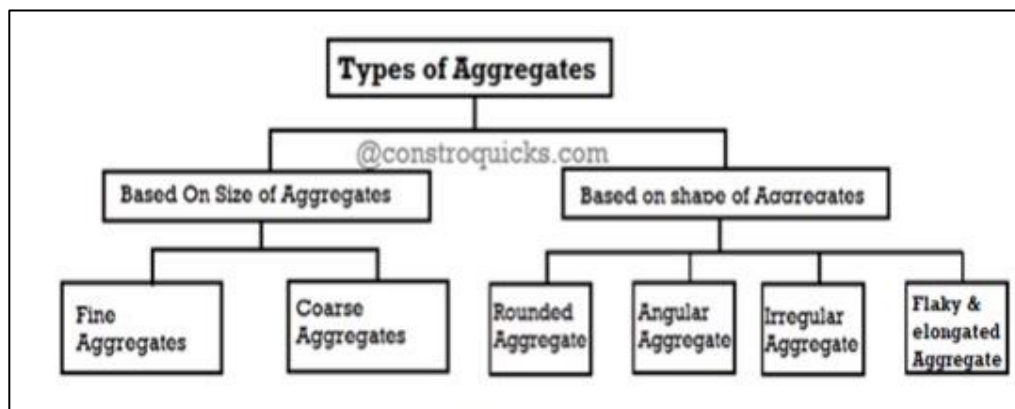


Diagram 2.1 Type of aggregates on the classification (constroquicks.com).

Table 2.2 Shown variation size of fine aggregate and coarse aggregated in many construction types

Table 2.2 Variation type of aggregate (constroquixks.com).

Fine Aggregates	Size variation	Coarse aggregate	Size
Coarse Sand	2.0mm – 0.5mm	Fine gravel	4mm – 8mm
Medium sand	0.5mm – 0.25mm	Medium gravel	8mm – 16mm
Fine sand	0.25mm – 0.06mm	Coarse gravel	16mm – 64mm
Silt	0.06mm – 0.002mm	Cobbles	64mm – 256mm
Clay	<0.002	Boulders	>256mm

2.2.3 SLUMP TEST

The slump test is not a measuring line to concrete strength. However, it is necessary to determine the scale of the concentration of the mixture in the best concrete production. This test is done before concrete can be poured into the building structure.

This test should be carried out on every lorry carrying concrete mixes to the construction site. The main purpose of this test is to determine the ease of work (degree of workability) of a concrete mixture.

The ratio of concrete materials is already determined as desired. Its strength depends on how the concrete is poured. Therefore, the concrete to be used must be poured and densely state. The factors affecting the ease of work, first of all, are the water content.

Further, the properties of the stone are of Baur - size, hardness, shape, and pattern of surface, also the ratio of water or cement (Skills Institute MARA Sungai Petani, Kedah, 2013).

2.3 HEALTH-RELATED

Shoveling is a task from manual handling that involves transferring loose material from one place to another place using purpose-built hand tools called shovels (Bridger et al.1997). Shoveling with conventional spades has some level of hazards attached.

As a consequence of poor shoveling techniques, back and neck pain was reported by (ICC (2014) because it places too much stress on the body's muscles and joints. In handling a shovel, the right size that works with the worker's body is recommended to be used while hands are kept at least 0.305 meters (12 inches) apart.

This provides better leverage and makes it easier to lift and toss. It was that work takes a break to avoid injuries and other health concerns as overworking puts undue stress on the heart and wears out muscles, leading to injuries. Musculoskeletal disorders such as muscle and bone troubles are regular among mining workers due to awkward working postures.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This methodology of the HAAZ concrete machine project will lead to our project to overarching strategy and rationale from our research. This phase will set the principles, equipment, materials, and techniques. Plan project design, and execute project management analysis data, Gantt chart, and flow chart that will lead to this project successfully.

3.2 METHODOLOGY FLOW CHART

Shows a methodology flow chart throughout this project was implemented to manage project work was planned.

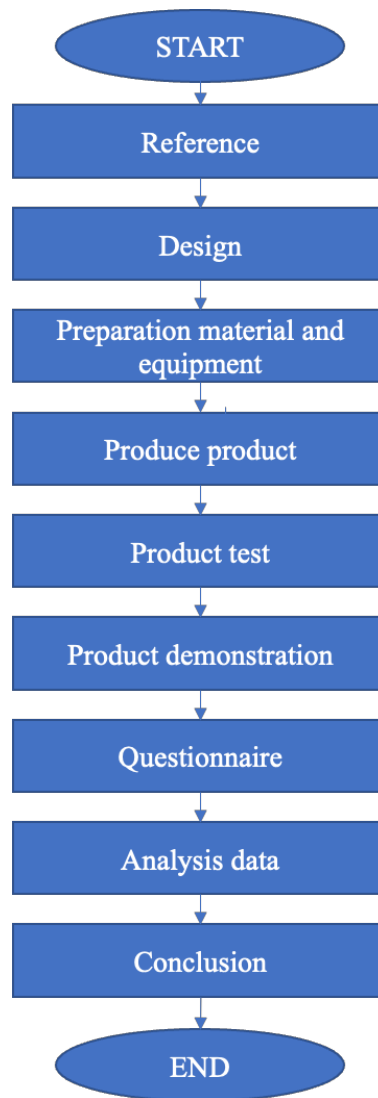


Diagram 3.1 Research flow chart.

3.3 RESEARCH OF DESIGN

Project designed research of HAAZ concrete machine that will be used to produce the project.

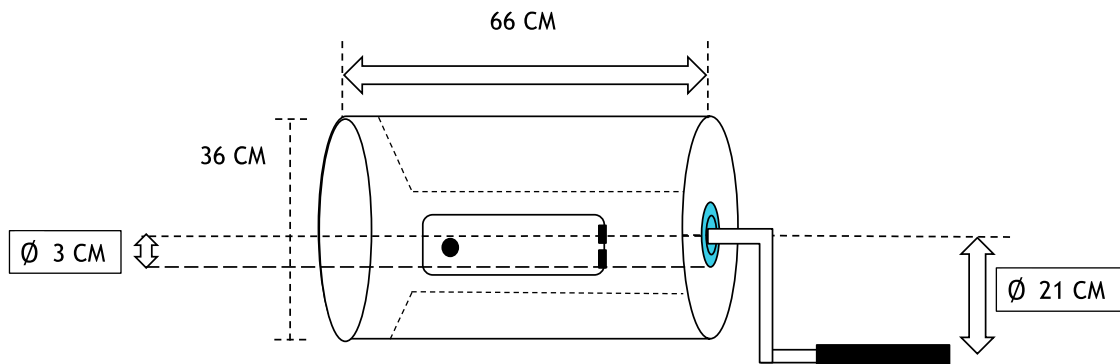


Diagram 3.2 Drum barrel total to produce rotation.

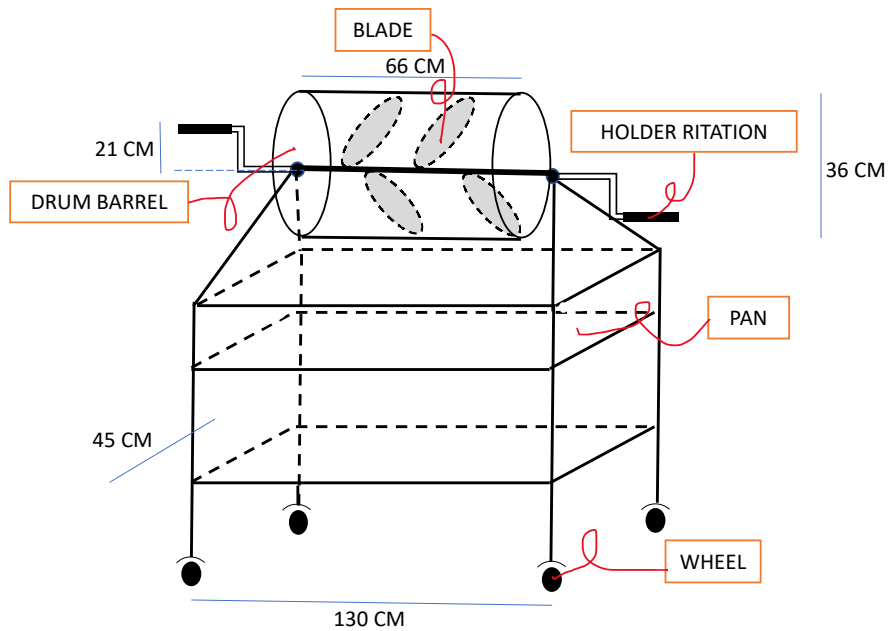


Diagram 3.3 Concrete machine design.

Design concrete machine in diagram 3.3 is the last design that we decide to produce the machine but there are several factors that we faced when we want to build the machine. Our group project has been a notice cooperation workshop. The first factor that we have faced is we need to use a lot of rod steel in producing the machine also increases the cost.

So, this makes a lot of work that we need to do. For example, a lot of work in grinding and welding the steel. This makes our group will take a long time to produce the machine since we are not professionals in this field and we just studied how to use all these things.

So, in our latest design, we have decided even though we just use a bit of steel but we increase the size of the s, tee, and l, and also, we can increase the strength of the that where can accommodate the concrete while the mixture is processed in the period.

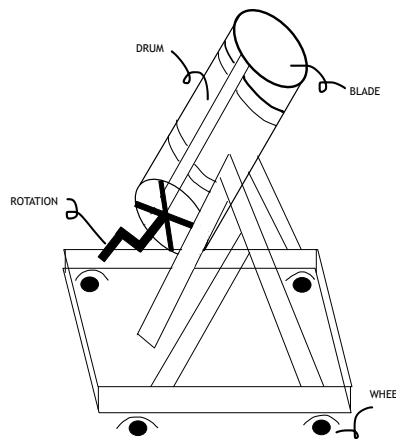


Diagram 3.4 Sketch design of machine concrete.

3.4 COST OF MATERIAL

The cost of materials that are needed to produce the concrete machine but drum barrel we can get by free from waste drum barrel material. Table 3.1 shows the estimated cost of the material that we used to produce our manual concrete machine.

Table 3.1 Cost of material.

No.	Material	Price per unit	Quantity	Price
1.	Drum barrel	RM43.60	1	RM43.60
2.	Steel rod	RM18.00	2	RM36.00
3.	Steel square (1.2mm x 1.2mm x 4feet	RM20.80	4	RM83.20
4.	Steel square (3/4 x1- 1/2 x1.0mm	RM13.40	4	RM53.60
	Steel blade			
5.	Wheel 8' inch	RM9.40	4	RM37.60
TOTAL				RM254
Workshop service				RM400

3.4.1 DRUM BARREL

Drum barrel is the main material that will be used to produce of project concrete machine. A drum barrel is a cylindrical shipping container used for shipping bulk cargo. Drums can be made of steel, dense paperboard (commonly called a fibber drum), or plastic, and are generally used for the transportation and storage of liquids and powders. Barrel drums are a class of membranophones, or drums, characterized by a barrel shape with a bulge in the middle.

They are often one-headed and open at the bottom. The barrel drum is played horizontally. In this project, the drum barrel's purpose is to make a concrete mixing place container where this drum will be rotated until the concrete is well mixed. We will get this barrel drum for free if we can find the waste material. If we do not find it, we will buy the reuse drum barrel on Shopee which cost RM 43.60.



Diagram 3.5 Plastic drum (tppackaging.com).

3.4.2 ANGLE BAR MILD/ROD/SQUARE STEEL

Rod steel is used as a concrete machine project frame that will further strengthen the design of the project. Steel rods/L will be used in several project designs such as on the machine legs, machine as well rotation holder. The angle bar mild that we will use is 1.2mm x 1.2mm 4 feet x4 cost for each RM20.80 and $\frac{3}{4}$ x 1/2 x 1.0m X4 cost for each RM13.40. the rod steel is 1 foot x2.



Diagram 3.6 Steel bar/rod/square (Mirai interior. id).

3.4.3 WHEEL

The wheel is for use to ensure the concrete machine is easy to move from one area to another area, especially when the machine is in the process of mixing concrete. This wheel features easy-to-engage total locks that lock both wheel and swivel and allow easy locking and repositioning. Load capacity for 8an inch design is can hold until 250 kgs this wheel will cost RM9.40 for each in the shop.



Diagram 3.7 Wheel (shopee.com).

3.3EQUIPMENT

This is the equipment that is needed to help complete the product from the cutting process and welding process.

3.5.1 GRINDING MACHINE

Grinding machines are used for cutting the rod steel and the Grinding machine also cuts the barrels drum by following the size of the plan. This grinder machine we can use for free by using the Polytechnic workshop grinder.



Diagram 3.8 Grinding machines (shopee.com).

3.5.2 WELDING MACHINE

The welding machine is a fabrication process whereby two or more parts are fused using heat, pressure, or both forming a joint as the parts cool. A welding machine will be used to fuse the wheel, bearing drums barrel, and the metal together. The completed welded joint may be referred to as a weldment. This machine also we can use for free by using the Polytechnic workshop welding.



Diagram 3.9 Welding machine (Amazon. in).

3.5.3 MEASURE TAPE

Measure tape is a flexible ruler to measure the length and the Wide of the drum barrel and metals that will be cut in any size. So, it will easily be the work process by using this flexible ruler. This measure we already have so we don't need to buy a new one.



Diagram 3.10 Measure tape (my.rs-online.com).

3.6 PROCESS PRODUCTION PRODUCT

This is the process of producing the machine to ensure the plan we planned is going well.

i. MEASUREMENT PROCESS

Measure the material that wants to be cut by using a measuring tape then mark that wants to be cut to connect the metal by using the welding machine by following the design plan.



Diagram 3.11 Measurement process (youtube.com).

ii. CUTTING PROCESS

Cut metals that have been marked by using the markers make sure to first step use safety protection such as in terms of face shields, fully covered clothing, and wearing boots.

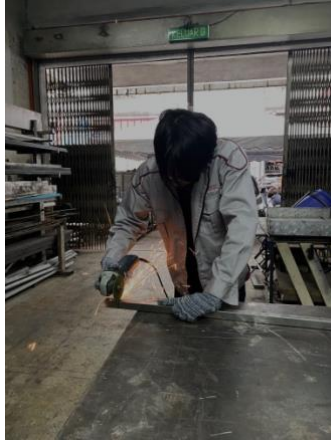


Diagram 3.12 Cutting process (istockphoto.com)

iii. WELDING PROCESS.

Connect the metal that has been cut according to the design plan also make sure the angle are correct by check it by ruler square. Before the welding process, the welding need to stir with the welding fluid cooling. This is the quick cooling method to avoid the process of welding are not over heat.



Diagram 3.13 Welding process (safetyandhealthmagazine.com).

3.7 QUESTIONNAIRE

This questionnaire consists of several sections to meet the characteristics required when responding to this product.

Table 3.2 Section questionnaire.

Section	Description
Section I	Demography
Section II	Level of satisfaction respondent of the product.
	A. Project design
	B. Product safety and health
	C. Employability
	D. Time concrete mixed
E. user-friendly	

In this questionnaire form responded we have 5 scales Likert that will be use as table 3.3

Table 3.3 Scale Likert Score.

Scale Likert	Description
1	Very Unsatisfied
2	Unsatisfied
3	Satisfied
4	Very satisfied

3.8 PRODUCT TESTING METHOD

In this product test, we have used a demonstration product by using a video to make sure all the respondents can watch it also use a slump test to test the concrete texture when using a shovel and our product.

3.8.1 DEMONSTRATION PRODUCT

To measure the level of satisfaction of the user, we will use a video as part of our product demonstration test. Where we will measure product usage satisfaction. What we will measure that is indicated in the video is the time difference between our concrete machine and the shovel concrete mixture for concrete blended well. In this questionnaire, we will use people who have certificates/ experience / qualified workers in this field to fill out the questionnaire form.

3.8.2 CONCRETE SLUMP TEST

A slump test is a laboratory or at-site test used to measure the consistency of concrete. The slump test shows an indication of the uniformity of concrete in different batches. The shape of the concrete slumps shows information on the workability and quality of concrete.

The characteristics of concrete concerning the tendency of segregation can be also judged by making a few tamping or blows by tapping the rod on the base plate. This test continues using since 1922 due to the simplicity of the apparatus and simple procedure. The shape of the Slump cone shows the workability of concrete.

The concrete Slump Test is a measurement of concrete's workability or fluidity. It's an indirect measurement of concrete consistency or stiffness. A slump test is a method used to determine the consistency of concrete. The consistency, or stiffness, indicates how much water has been used in the mix. The stiffness of the concrete mix should be matched to the requirements for the finished product quality.

The main reason to perform the test is to ensure batches of the same concrete are of constant quality and strength. The more water is added to a mix, the weaker the concrete gets. If customers require a higher workability/more flowing concrete (a higher slump result) we need to increase the cement content to ensure the concrete still reaches its target strength. This test is just one of the ways we ensure the quality of our concrete. Water is the enemy when it comes to concrete strengths. ([Total Concrete Ltd.2022](#))



Diagram 3.14 Slump test concrete (pinterest.com).

3.8.3 PROCEDURE OF SLUMP TEST

- i. Set up tools to do a fall test
 - a. The mold for the concrete slump test is a frustum of a cone, 300mm (12 in) in height. The base is 200mm (8in) in diameter and it has a smaller opening at the top of 100mm (4in).
 - b. Steel rods 16mm in diameter and 600mm in Length (standard tamping).
 - c. Measuring tape (to measure the fall of concrete).

- ii. The base is placed on a smooth surface and the container is filled with concrete in three-layer, whose workability is to be tested.
- iii. Each layer is tamped 25 times with a steel rod.
- iv. When the mold is filled with concrete, the top surface is struck off (levelled with mold top opening) using screening and rolling motion of the tamping rod.
- v. The mold must be firmly held against its base during the entire operation so that it could not move due to the pouring of concrete and this can be done through handles or footrests brazed to the mold.
- vi. Immediately after filling is completed and the concrete is levelled, the cone is slowly and carefully lifted vertically, and an unsupported concrete will now slump. The slump is measured by placing the cone just beside the slumped concrete and the tamping rod is placed over the cone so that it should also come over the area of slumped concrete.
- vii. The height of the measured rubble should not exceed 75mm, not less than 25mm, only then the concrete is allowed to be brought into the construction site. If the rubble exceeds 75mm, the calculated test fails and the concrete needs to be changed.

3.8.4 TYPE OF CONCRETE SLUMP

The slumped concrete takes various shapes, and according to the profile of slumped concrete, the slump is termed as:

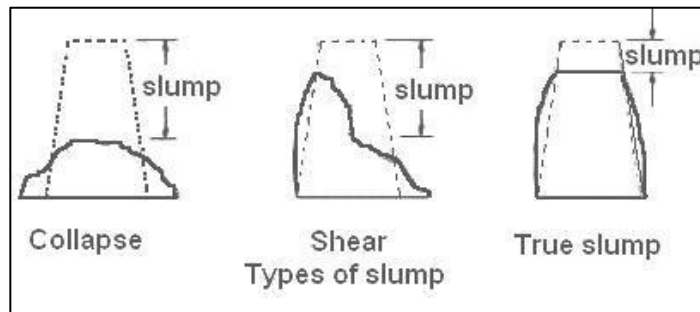


Diagram 3.15 Type of slump test.

3.8.5 SHEAR SLUMP

In a shear slump the top portion of the concrete shears off and slips sideways. If one-half of the cone slides down an inclined plane, the slump is said to be a shear slump. The shear slump indicates that the result is incomplete, and concrete needs to be retested for valid results.

- I. If a shear or collapse slump is achieved, a fresh sample should be taken and the test is repeated.
- II. If the shear slump persists, as may be the case with harsh mixes, this is an indication of a lack of cohesion in the mix.

3.8.6 COLLAPSE SLUMP

In a collapse slump, the concrete collapses completely. A collapse slump will generally mean that the mix is too wet or that it is a high workability mix, for which a slump test is not appropriate. It means the water-cement ratio is too high, i.e. concrete mix is too wet or it is a high workability mix, for which a slump test is not appropriate.

3.8.7 TRUE SLUMP

In a true slump, the concrete simply subsides, keeping more or less shape.

- i. This is the only slump that is used in various tests.
- ii. Mixes of stiff consistency have a Zero slump so that in the rather dry range no variation can be detected between mixes of different workability.

However, in a lean mix with a tendency to harshness, a true slump can easily change to the shear slump type or even to collapse, and widely different values of slump can be obtained in different samples from the same mix; thus, the slump test is unreliable for lean mixes.

3.8.9 APPLICATIONS OF SLUMP TEST

- I. The slump test is used to ensuring different batches of similar concrete under field conditions and to ascertain the effects of plasticizers on their introduction.
- II. This test is very useful on-site as a check on the day-to-day or hour-to-hour variation in the materials being fed into the mixer. An increase in a slump may mean, for instance, that the moisture content of aggregate has unexpectedly increased.
- III. Another cause would be a change in the grading of the aggregate, such as a deficiency of sand.
- IV. Too high or too low a slump gives an immediate warning and enables the mixer operator to remedy the situation.
- V. This application of the slump test as well as its simplicity, is responsible for its widespread use.

Table 3.4 The workability of slump test shown below by the degree workability and the compacting factor.

Degree of workability	Slump		Compacting Factor	Use for which concrete is suitable
	mm	in		
Very low	0-25	0-1	0.78	Very dry mixes; used in road making. Roads vibrated by power operated machines.
Low	25-50	1-2	0.85	Low workability mixes; used for foundations with light reinforcement. Roads vibrated by hand operated Machines.
Medium	50-100	2-4	0.92	Medium workability mixes; manually compacted flat slabs using crushed aggregates. Normal reinforced concrete manually compacted and heavily reinforced sections with vibrations.
High	100-175	4-7	0.95	High workability concrete; for sections with congested reinforcement. Not normally suitable for vibration

3.9 DATA ANALYSIS

The analysis data method that we will use is google form graph frequency. We will fill all the forms with the data that we will get from the form questionnaire that respondents fill out and from the compressive test data.

Then, from the data that we fill in the google form, we will get the graph and chart to see how the flow pattern how many respondents are satisfied or with unsatisfied this product, and how to strengthen the concrete that the machine produces.

3.10 GANTT CHART PROJECT ACTIVITIES

The Gantt chart project was implanted through this activity in the current semester 4 and semester 5.

Table 3.5 Legend Gantt chart.

	Estimated time
	Actual time

Table 3.6 Activities final year project session 1.

ACTIVITIES / WEEKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Briefing FYP 1 and preparation of design thinking														
Briefing topic 1														
Preparation defence proposal														
Briefing topic 2														
Preparation 1														
Briefing topic 3														
Seminars preparation														
Presentation 2 and submit report														

Table 3.7 Activities final year project session 2

ACTIVITIES / WEEKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Briefing FYP 2	Blue													
Preparation sample prototype sample	Green	Blue												
Make project prototype sample		Green	Blue											
Make project			Green	Blue										
Test project				Green	Blue	Blue	Blue							
Project presentation 1					Green	Green	Green	Blue	Blue					
Report 2								Green	Green	Blue	Blue	Blue		
Presentation project 2										Green	Green	Green	Blue	Blue
													Green	Green

3.11 CONCLUSION

Based on this topic we can prepare based on the plan to produce the project with such a methodology and the literature research review to complete this project to achieve the objectives that have been planned. However, completing all these topics take 14 weeks in final year project 1 on session 2: 2021/2022.

CHAPTER 4

RESEARCH ANALYSIS & DISCUSSION

4.1 INTRODUCTION

This chapter discusses the findings of the study based on the test results and responses from respondents to the questionnaire conducted. The results of this chapter were obtained from the questionnaire distributed to PSA students, in semester 5. After all the data and information were obtained, analysis was done to see the effectiveness of the study.

The analysis started with a test comparing the mixing time of cement using a shovel and our product. Next, we analyzed the data by using a questionnaire to study the level of satisfaction with our products based on the respondents.

The results of the study in this chapter are used to obtain conclusions about the level of satisfaction with the use of our project for PSA students in addition to achieving the objective of this study is to compare the mixing time according to conversion and innovative machines and produce concrete workability by conducting slump tests.

In addition, the results of this chapter's study can also achieve our final objective, which is to measure the level of user satisfaction with the product. Therefore, this chapter will explain the findings of the comparison of cement mixing time using shovels and our products as well as the questionnaire that has been conducted.

4.2 HAAZ MANUAL CONCRETE MACHINE

HAAZ Manual Concrete Machine is an innovative project of an existing concrete machine made by yourself (DIY). Innovative comes from the side of ideal design and also from the height level of existing concrete machines. HAAZ Manual Concrete Machine is created by using strong iron and a drum barrel that has a low mass compared to existing drum barrels.

Our product is specially designed to mix small quantities of cement and is specially designed for PSA students who want to do concrete lab work. HAAZ Manual Concrete Machine is operated by hand rotation. It is also called an alternative mix without using a spade as a mix and without using an electric concrete machine.

Furthermore, HAAZ Manual Concrete Machine can save time to mix cement compared to using shovels or conventional methods which will slow down the work process and make it difficult for students. Our product has undergone a time-tested test to brew. The analysis data of this study will be told in Chapter 4.





Diagram 4.1 HAAZ Manual Concrete Machine.

4.3 DATA ANALYSIS

The table are used in make a comparison between the shovel and our innovation machine concrete. We are conduct the slump test in the data collector we are use a time of mixture how long the concrete mixture well and also how many steps that we need to completed the process.

Table 4.1 Comparison of step and time between shovel and machine.

No.	Shovel	Time by used shovel	HAAZ Manual Concrete Machine	Time by used manual machine
				
1.	Prepare all the tools and materials according to the set ratio (1:2:4)	±10 minutes	Prepare all the tools and materials according to the set ratio (1:2:4)	±10 minutes

No	Shovel	Time by used shovel	HAAZ Manual Concrete Machine	Time by used manual machine
2.	Combine all ingredients except water, mix well using a shovel and make a hole in the middle.	9.56 minutes	Put all the ingredients except water in the machine.	5.16 minutes
3.	Besides, pour water little by little and mix using a shovel until it is well mixed.		Besides, pour water and rotate the rotor to mix the cement mixture.	
4.	Pour all the mixture into the bucket.		Pour all the mixture into the bucket.	
5.	Pour some cement mixture into the slump test tool and tap it using the provided tamping iron 25 times, repeat this step until it is full.	4 minutes	Pour some cement mixture into the slump test tool and tap it using the provided tamping iron 25 times, repeat this step until it is full.	4 minutes

no	Shovel	Time by used shovel	HAAZ Manual Concrete Machine	Time by used manual machine
6.	Then, pick up the slump test tool and measure the fall rate of the mix using a ruler.	Decay rate	Then, pick up the slump test tool and measure the fall rate of the mix using a ruler.	Decay rate
		3.35mm		2.43mm
		23.56min		19.16min
	TOTAL MINUTE			

4.3.1 WORKABILITY

The level of workability of our products is very good. This is because, this HAAZ Manual Concrete Machine can accommodate the mass of concrete mix which we know when materials such as sand, cement, and aggregate will be very heavy when mixed with water. By used our product can reduce 4.40minute from 23.56minute by used shovel to the 19.16minute.

Our product can accommodate a heavy mass due to its ideal design and is very stable so that it can rotate well. In addition, this HAAZ Manual Concrete Machine is lightweight. This will make it easier for users to use our products without using a lot of energy like using a shovel.

From the test we made, we make are comparison by using time to make the slump test. To prepare the tools and to prepare the materials we need 10 minutes. After that to combine the all materials we need 23.56 minute for shovel while for our machine we just take 19.16 minute. In here we can reduce the mixture of concrete by use different of mixture.

1.4 RESPONDENT DEMOGRAPHIC

This section presents a summary of the respondent's background content based on gender and occupation. The results will be discussed in terms of percentage, as shown in Table 4.4.1. In total, 43 respondents contribute 100% to this study.

Table 4.2. Profile of respondents

	Background	Respondents, N	Percentage	
Gender :	Female	23	53.50%	
	Male	20	46.50%	
Category:	Student	36	83.70%	
	Government Employee	1	2.30%	
	Private Sector Workers	3	7%	
	Others	3	7%	
	Age:	18 years old	1	2.30%
		19-25 years old	40	93%
26-30 years old		1	2.30%	
30 years old and above		1	2.30%	
Ethnicity:		Malay	39	90.70%
	Chinese	1	2.30%	
	Indian	2	4.70%	
	Others	1	2.30%	

Men have a total of 20 respondents which is 46.5% while women have a total of 23 respondents comprising 53.5%. There are only 4 categories in this survey. The categories are known as students, government employees, private workers, and others.

Students have a total of 36 respondents which is 83.70% of the total number of respondents. government employees have one which is 2.30% of the total. then private staff and others have the same number of 3 respondents which is only 7%.

4.4.1 Effectiveness of HAAZ Manual Concrete Machine.

Table 4.3 shows the mean score for the design of this innovative concrete machine is stronger than the existing manual machine. The mean score with satisfying achievement is 3.56 showing that they have a very high level.

Table 4.3. Level of satisfaction of respondents with the product

No.	Statement	Mean Score
1.	This innovative concrete machine design is stronger than existing manual machines to accommodate concrete mixing.	3.21
2.	Innovative concrete machines are more user-friendly because they are easy to use and operate.	3.44
3.	This concrete machine has a higher level of marketability.	3.28
4.	The time required to mix the concrete well is shorter than using a shovel.	3.56
5.	The use of this innovative concrete machine can reduce the problem of back pain during the process of mixing concrete compared to the use of shovels.	3.40
Average		3.80

This objective shows and presents the findings of the study conducted to test function and effectiveness during the use of the HAAZ Manual Concrete Machine and respondents' opinions about our products during the usage process. HAAZ Manual Concrete Machine is an innovation from the existing concrete machine that is already do-it-yourself (DIY).

HAAZ Manual Concrete Machine can be used to facilitate PSA students to run concrete lab work that is during the process of mixing cement. Our product will have a positive impact on reducing cement mixing time compared to using a shovel. Data analysis is the process of collecting and organizing data to draw good conclusions. The purpose of this distributed question is to see how far our product can help users.

In this study, the sample size of 43 samples is sufficient for this study. The researcher distributed copies of the questionnaire to the targeted respondents 43 samples of them completed questionnaires were received by the researcher.

Table 4.3 shown above is the mean score for each question and meaningful interpretation of respondents' level of satisfaction with our products compared to weak to very high. As shown in Table 4.3 the mean is 3.21 for question 1 which asks, 'This innovative concrete machine design is stronger than existing manual machines to accommodate concrete mixing.' Question 2 is 'Innovative concrete machines are more user-friendly because they are easy to use and operate', and the mean is 3.44

The first question is clearly stated and understood as an important category with a mean of 3.21. Among all the questions, this first question has the lowest average mean compared to the others. Although the number of respondents who did not agree with the question, we asked was 2 people. Here it is clear that the design of our product needs to be improved to achieve a level of user satisfaction.

As stated in Question 2, with a mean of the mean 3.44. This shows innovative concrete machines are more user-friendly because they are easy to use and operate. This is because respondents can see that the height of our product is not too high and use electricity or fuel that will cause pollution. Our products can also be categorized as eco-friendly products.

Furthermore, in Question 3, with a mean 3.28. With the number of respondents who do not agree is 7 people and the total strongly agree is 36 people. This shows that the marketability of our products can be highlighted well. However, it can be seen that a total of 7 respondents do not agree with the marketability of our products. The ranking of this criterion is not at all surprising because perhaps a few of these respondents do not know or are not given early enlightenment about the marketability of a product.

From the question 4 the time required to mix concrete well is shorter than using a shovel. With the mean average value of 3.56 this shows the meanest value among others. The average shows that respondents strongly agree with the wisdom of our product being able to save time mixing cement compared to using a shovel. Only 2 respondents disagreed with the time saving of our product. Here it can be concluded, a few of them prefer to use a shovel, and the probability of this group is less than 25 years old.

Finally, question 5 can be seen that the use of this innovative concrete machine can reduce the problem of back pain during the process of mixing concrete compared to the use of shovels. with a mean of 3.40 It is shown that the interpretation of meaning is in a good high position. This can be seen because the time required to mix cement is short compared to using a shovel. This will reduce the problem of back pain when mixing cement.

4.5 DATA QUESTIONNAIRE HAAZ MANUAL CONCRETE MACHINE

The diagram below is a pie chart for the demography and the question of research for the data finding from the respondent.

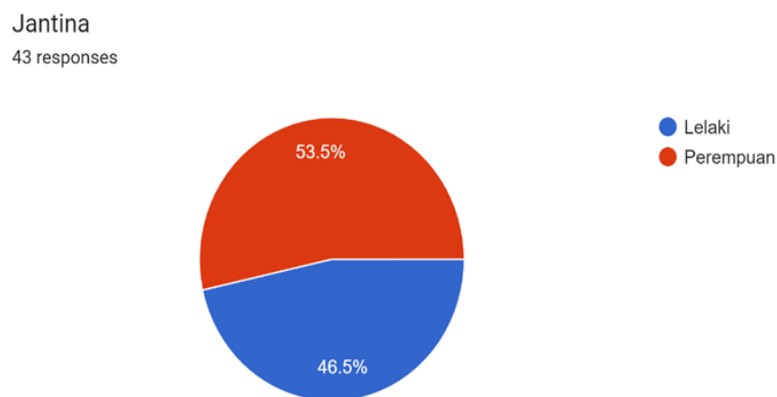


Diagram 4.2 Pie chart for respondent gender.

Umur
43 responses

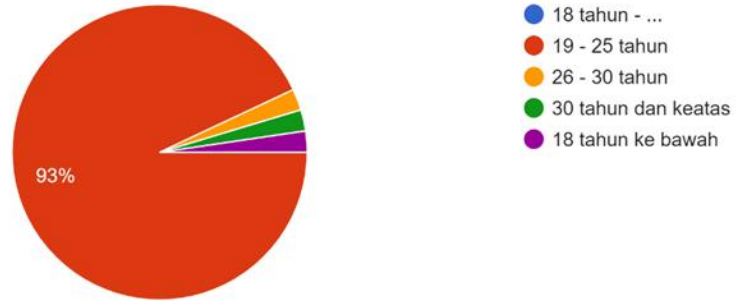


Diagram 4.3 Pie chart for respondent age.

Agama
43 responses

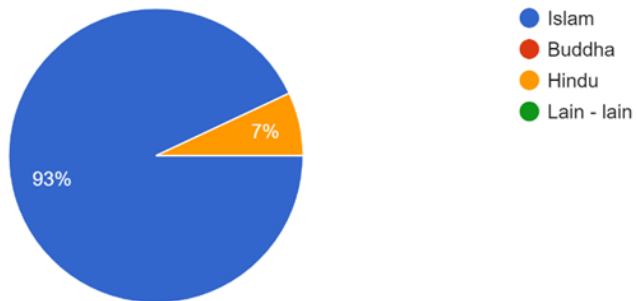


Diagram 4.4 Pie chart for respondent's religion.

Bangsa
43 responses

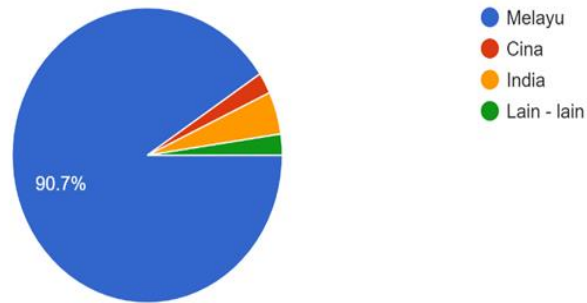


Diagram 4.5 Pie chart for respondent's ethnicity.

Pengalaman waktu bekerja
38 responses

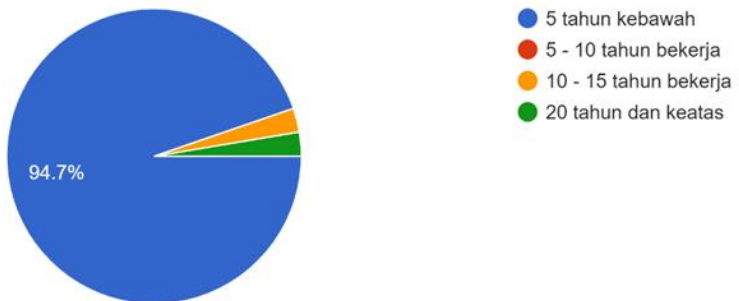


Diagram 4.6 Pie chart for respondent's working time experience.

Pekerjaan
43 responses

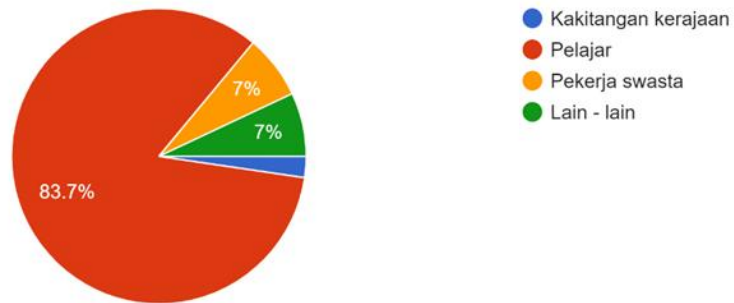


Diagram 4.7 Pie chart for respondent's occupation.

4.6 CONCLUSION

Questionnaire research is very important in the success of a project and also to find out if the objective is achieved or not through feedback.

Based on the feedback received through this questionnaire it can be concluded that the use of the HAAZ Manual Concrete Machine as an aid can have a positive effect on the concrete mixing process. In addition, it helps respondents simplify and save time during the concrete mixing process.

CHAPTER 5

CONCLUSION AND SUGGESTION

5.1 INTRODUCTION

This chapter concludes the results and findings about the "HAAZ Manual Concrete Machine". The researcher has conducted a wide and comprehensive study to develop a manual concrete machine that is safe and meets each of our objectives, to identify the term factors, and to ensure that the level of usage of the manual concrete machine created by us is satisfied and meets the taste.

We have also developed this manual concrete machine to make it easier for PSA students to carry out the work of mixing concrete in the concrete laboratory and at the same time, save time for the mixing process. Lastly, recommend future research that can improve the methodology introduced in this research.

5.2 CONCLUSION

HAAZ Manual Concrete Machine is an innovative project from an existing concrete machine that is made oneself (DIY). Innovation comes from the design side as well as from the height of the concrete machine level. After all, our manual concrete machine is specially designed to make it easier for PSA students to start concrete mixing work.

With a design that is easy to carry anywhere due to the size that is not too big and heavy, it is very suitable for students who especially mix concrete in a small ratio. therefore, the availability of our manual concrete machine can help PSA students in carrying out concrete mixing activities as well as saving mixing time instead of using a shovel which can be harmful to the spine posture.

5.3 SUGGESTION

The results of the findings show that HAAZ Manual Concrete Machine is functional and useful. The objective of this project was achieved because our manual concrete machine can save concrete mixing time compared to the use of shovels.

In addition, this HAAZ Manual Concrete Machine has received a good response from the respondents. At the end of this study, the recommendations for the improvement of this project are as shown below:

- i. Reducing the size of the existing drum barrel to a smaller size to make it easier for users to remove the finished mixture.
- ii. Reinforce the design of this concrete machine so that it can accommodate a larger concrete mixing ratio and can compete with products on the market.

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APPENDIX

APPENDIX I

The image displays two screenshots of a Google Docs form titled "Bahagian I". The form is presented in a mobile view and contains several sections of questions, each with radio button options. The first screenshot, taken at 6:55, shows the "Jantina" (Gender) and "Umur" (Age) sections. The second screenshot, taken at 6:56, shows the "Agama" (Religion), "Pekerjaan" (Occupation), and "Pengalaman waktu bekerja" (Work experience) sections. The "Umur" and "Pengalaman waktu bekerja" sections have a scroll bar at the bottom, indicating more options are available.

Bahagian I

Jantina *

- Lelaki
- Perempuan

Umur *

- 18 tahun - ...
- 19 - 25 tahun
- 26 - 30 tahun
- 30 tahun dan keatas

Bangsa *

- Melayu
- Cina
- India
- Lain - lain

Agama *

- Islam
- Buddha
- Hindu
- Lain - lain

Pekerjaan *

- Kakitangan kerajaan
- Pelajar
- Pekerja swasta
- Lain - lain

Pengalaman waktu bekerja

- 5 tahun kebawah
- 5 - 10 tahun bekerja
- 10 - 15 tahun bekerja
- 20 tahun dan keatas

APPENDIX II

6:56 4G 54%


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Bahagian II

Arahan : tandakan (/) pada ruangan yang disediakan mengikut skala di atas yang telah ditetapkan.

Skala liket	Penerangan
1	Sangat tidak setuju
2	Tidak setuju
3	Setuju
4	Sangat setuju

Hasil projek (HAAZ MANUAL CONCRETE MACHINE)



The image shows a person wearing a pink long-sleeved shirt and a pink hijab, standing in a workshop or laboratory. They are operating a manual concrete machine, which consists of a large blue cylindrical drum mounted on a black metal frame with four wheels. The person is leaning over the machine, possibly adjusting it or preparing to use it. The background shows a large industrial space with a high ceiling and various equipment.

docs.google.com

Mesin konkrit ini mempunyai tahap kebolehpasaran yang lebih tinggi. *

sangat tidak setuju

1

2

3

4

sangat setuju

docs.google.com

Reka bentuk mesin konkrit berinovasi ini lebih kukuh berbanding mesin manual sedia ada untuk menampung bancuhan konkrit. *

sangat tidak setuju

1

2

3

4

sangat setuju

Masa yang diperlukan untuk bancuhan konkrit sebatu dengan baik adalah lebih singkat berbanding menggunakan penyodok (shovel). *

sangat tidak setuju

1

2

3

4

sangat setuju

Mesin konkrit berinovasi lebih mesra pengguna kerana mudah untuk digunakan dan dikendalikan. *

sangat tidak setuju

1

2

3

4

sangat setuju

Penggunaan mesin konkrit berinovasi *
ini dapat mengurangi masalah sakit
belakang ketika proses membancuh
konkrit berbanding penggunaan
penyodok.

sangat tidak setuju

1

2

3

4

sangat setuju

Back

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BORANG INVENTORI PROJEK PELAJAR

PERKARA	MAKLUMAT																
Program:	Diploma kejuruteraan awam																
Jabatan:	Jabatan kejuruteraan awam																
Semester/ Tahun:	Sesi 1 2022/2023																
Tajuk Kajian/Projek:	HAAZ Manual Concrete Machine																
Jenis Kajian/Projek:																	
Kategori Kluster Penyelidikan:	<table border="1"> <tbody> <tr> <td></td> <td>Sains Tulen</td> <td></td> <td>Sains Sosial</td> </tr> <tr> <td>/</td> <td>Sains Gunaan</td> <td></td> <td>Sastera & Sastera Ikhtisas</td> </tr> <tr> <td>/</td> <td>Teknologi & Kejuruteraan</td> <td>/</td> <td>Warisan Alam & Budaya</td> </tr> <tr> <td>/</td> <td>Sains Kesihatan & Klinikal</td> <td>/</td> <td>ICT</td> </tr> </tbody> </table>		Sains Tulen		Sains Sosial	/	Sains Gunaan		Sastera & Sastera Ikhtisas	/	Teknologi & Kejuruteraan	/	Warisan Alam & Budaya	/	Sains Kesihatan & Klinikal	/	ICT
	Sains Tulen		Sains Sosial														
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/	Teknologi & Kejuruteraan	/	Warisan Alam & Budaya														
/	Sains Kesihatan & Klinikal	/	ICT														
Ahli Kumpulan:	<ol style="list-style-type: none"> Nama: Muhd Hazwani Syuaib Bin Abdul Ghani No. Pendaftaran Pelajar: 08DKA20F1028 Nama: Siti Nur Farahana Bt M Idrus No. Pendaftaran Pelajar: 08DKA20F1022 																
Penyelia:	Nama: Yusnita bt yusof No. Kad Pengenalan: 800303-08-5458																
Objektif Kajian/Projek:	<ul style="list-style-type: none"> To produce product of innovation concrete machine. To compare time of mixture by conversional and innovative machine and to produce a workability of concrete by conduct slump test To measure level of satisfaction respondent of the product. 																

PERKARA	MAKLUMAT
Skop Kajian/Projek:	<p>The main material, is a drum barrel, steel, bearing, wheel, rubber, and tray. The size of the drum barrel that will be used is 66cm x 36cm. The optimum litters which we set u in 30-40 litters with an actual maximum is 70 litters to ensure the product works well continuously and is used for a long period. To get 1 round equal 7 spins we will design the project with a radius of the ball of 3cm x handle of radius cm.</p> <p>Our project will use a questionnaire concept through the respondents we will show a project video testing that will be used to show to the people who have experience or qualified workers about Field. Our user target is a construction that involves small work and student students the current is user-friendly.</p> <p>A concrete slump test will be conducted to measure the concrete workability or fluidity. It's an indirect measurement of concrete consistency or stiffness. The shape of the concrete slumps shows information on the workability and quality of concrete. The characteristics of concrete concerning the tendency of segregation can be also judged by making a few tamping or blows by tapping the rod on the base plate.</p>

Abstrak
Kajian/Projek:

HAAZ Manual Concrete Machine is an innovative project from existing self-made concrete machines (DIY). Our products are specially designed for small-scale concrete brewing uses. Furthermore, our product is especially for PSA students who want to carry out the concrete mixing process. One of the first concrete mixers ever developed in 1900 by T.L. Smith in Milwaukee.

The methodology of this HAAZ Manual Concrete Machine project will lead to our project to a comprehensive strategy and rationale from our research. This phase will set principles, equipment, materials, and techniques. Plan the project design, and implement project management analysis data, Gantt charts, and flowcharts that will lead to this project success. Based on the feedback received through this questionnaire it can be formulated that the use of the HAAZ Manual Concrete Machine as an auxiliary tool can positively affect the concrete mixing process.

In addition, it helps respondents facilitate and save time during the concrete brewing process. In conclusion, our product managed to meet all the objectives that have been made. This product is also able to compete in the external market and can reduce the time on concrete mixing. The results from the interpretation mean score is high from our respondent questionnaire and the hope for this product is that it is necessary to improve the product design to be stronger and the consumer satisfied.

<p>Infografik Kajian/Projek:</p>		
<p>Peringkat: <i>(sekiranya ada menyertai pertandingan)</i></p>	<p><u>Jabatan</u>/ Politeknik/ JPPKK/ Kebangsaan/ Antarabangsa</p>	
<p>Disemak oleh:</p> <hr/> <p>Tandatangan Penyelaras Kursus Projek Nama dan Cop:</p>	<p>Disahkan oleh:</p> <hr/> <p>Tandatangan Penyelaras Projek Pelajar Jabatan Nama dan Cop:</p>	



**PERTANDINGAN AKHIR
PROJEK PELAJAR & PAMERAN INOVASI
2022**

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HAAZ MANUAL CONCRETE MACHINE

ABSTRACT

HAAZ Manual Concrete Machine is an innovative project from existing self-made concrete machines (DIY). Our products are specially designed for small-scale concrete brewing uses. Furthermore, our product is especially for PSA students who want to carry out the concrete mixing process. One of the first concrete mixers ever developed in 1900 by T.L. Smith in Milwaukee. The methodology of this HAAZ Manual Concrete Machine project will lead to our project to a comprehensive strategy and rationale from our research. This phase will set principles, equipment, materials, and techniques. Plan the project design, and implement project management analysis data, Gantt charts, and flowcharts that will lead to this project successfully. Based on the feedback received through this questionnaire it can be formulated that the use of HAAZ Manual Concrete Machine as an auxiliary tool can positively affect the concrete mixing process. In addition, it helps respondents facilitate and save time during the concrete brewing process. In conclusion, our product, managed to meet all the objectives that have been made. This product is also able to compete in the external market as it is able to reduce time on concrete mixing. The results from the interpretation mean score is high from our respondents questionnaire and hope on this product is that it is necessary to improve the product design to be stronger and the consumer satisfied.

Keywords: concrete machine, design, time



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OBJECTIVE

- i. To produce product of innovation concrete machine.
- ii. To compare time of mixture by conversional and innovative machine and to produce a workability of concrete by conduct slump test
- iii. To measure level of satisfaction respondent of the product.

METHODOLOGY



PRODUCT



RESULT

	Background	Respondent's No	Percentage	No.	Statement	Mean Score
Gender	Female	23	53.50%	1.	This innovative concrete machine design is stronger than existing manual machines to accommodate concrete mixing.	3.21
	Male	20	46.50%			
Category	Student	36	83.70%	3.	Innovative concrete machines are more user-friendly because they are easy to use and operate.	3.44
	Government Employee	1	2.30%			
	Private Sector Workers	3	7%			
	Others	3	7%			
Age	18 years old	1	2.30%	4.	The time required to mix the concrete well is shorter than using a shovel.	3.56
	19-25 years old	40	93%			
	26-30 years old	1	2.30%			
	30 years old and above	1	2.30%			
Ethnicity	Malay	39	90.70%	5.	The use of this innovative concrete machine can reduce the problem of back pain during the process of mixing concrete compared to the use of shovels.	3.40
	Chinese	1	2.30%			
	Indian	2	4.70%			
	Others	1	2.30%			
Average						3.38

IMPACT

The concrete machine are able to reduce time of mixing concrete.

Where the use of machine does not need to mix from area to another area, it should only be rotated together instead of using the mixed shovel should be done from one area to another area to ensure that the concrete mixture is completely mixed

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