



SAFETY BABY CRADLE

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JUN 2019 SESSION

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TITLE: SAFETY BABY CRADLE

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ABSTRACT

Increasing advancement and innovation in technology tends to improve the existing products.

There are various types of improvement and changes on baby cradle from manual to automatic. However, the innovation of baby cradle spring still lacks safety features and contribute to a lot of cases involving babies that causes injured and death. Therefore, the innovation of baby cradle spring with additional safety will be able to help to prevent the accident cases from occurring. The objective of this project is to design and develop a prototype of automatic baby cradle spring with more safety features. The scope of this product is using radio frequency 315Mhz and the distance between the alarm and the cradle cannot exceeds 100m. The equipment used in making this project are Arduino Nano, vibration sensor, jumper wire, buzzer, single relay board, motor cradle, adaptor power supply 12vdc, transmitter and receiver. When the baby awakes and make some unstable movements in the cradle, the sensor will detect any vibrates that baby made from his unstable movement and will triggered the alarm to alert the parents and the spring will stop swinging. In conclusion, with a proper observation, research and methodology employed, this project will be able to reduce cases or accidents involving the babies with the additional use of the spring in the future.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In the 21st century, there's a lot of technology has evolved into many forms. Due to 4.0 Revolution phase, the technologies become more advance and more efficient in helping and solving the problems in daily life such as Artificial Intelligence (AI), Quantum Computing (supercomputing), Augmented Reality (AR) and Virtual Reality (VR), Global Internet of Things (IOT) and Blockchain Technology are really trending technology in 2019. The world completely changes when times and manpower has been greatly reduced when using nowadays technology.

The baby cradle also kind of technology that has a great innovation from years to years. It's also popular among the parents and the babysitter that have their own baby or kid to keep in the home or nursery. Generally, cradle is an appliance, which is use to carry a baby and oscillate automatically with certain speed for comfort sleep of a baby. However, the recent innovations of baby cradle spring still lack safety features and contribute to a lot of cases involving babies that causes injured and death. Thus, we have designed and invented a system of baby cradle with an advance technology and more safety feature and it's named as Safety Baby Cradle. It can be classified based on their mechanism, function, structure and it's controllability This system using vibration and radio frequency 315mHz as the main features. This system aims at two main things in assisting parents. Firstly, the spring will auto stop swinging after successfully detected any movements that baby made in the cradle. Secondly, the system will inform the parents if the cradle stopped from swinging. So, with this all kind of safety features, it will increase the safety precaution in the cradle.

1.2 BACKGROUND OF RESEARCH

As the world going to develop with great invention and innovation, the baby cradle is not forgotten to have innovation and new invention through this year. Although many innovations have been applied on baby cradle, the baby cradle still lacks something which is the safety feature. This thing has been proved by the data of the number of accidents using baby cradle and questionnaire that have been done by the public.

According to the data of the number of accidents using baby cradle at Malaysia, the cases increased slightly from 2015-2018. This situation has terrifying the people who have a baby or child that using the baby cradle at home. The issues like this shouldn't be neglected since the accident involving the innocent child and the baby.

The questionnaire has been deployed as the important steps to collect and analysis the problem that society faces nowadays. The questionnaire has been done by the public at general way which is using google form to survey what their opinions about the current issues involving the baby and the child in accident using the baby cradle. A lot responding to add more safety features on the baby cradle to prevent or reduce the risk of using the baby cradle.

1.3 PROBLEM STATMENT

As to fit into ages of 21st century, there are various types of improvement and changes on baby cradle from manual to automatic. Even though there are many improvements and changes on baby cradle, the baby cradle still lack safety feature where the kids around age 2 years old to 4 years old tends to drop himself while the cradle still swinging and that might cause the spring over-stretched due to movement the baby inside the cradle and causing the cradle collapsing onto the kids. At the same time, the parents or the babysitter that not being around with the baby may not able to help the baby from the accident as the accident is occurs for long time

Besides, Malaysia surprised by the increased a lot of cases baby fell from the cradle. Figure 1 below shows the graph statistic of number of accidents using the baby cradle from year 2015 to 2018. In 2015, there was 4 cases involving the babies in accident using the cradle but in 2016 the number of accidents using baby cradle was 2 cases. In the 2017, the number of accidents using baby is rising again as much as 4 cases and slightly increased to 6 cases in 2018. So, the data shows the number of accidents per year using the baby cradle is becoming more serious from year to year and need to be control or solves as soon as possible.

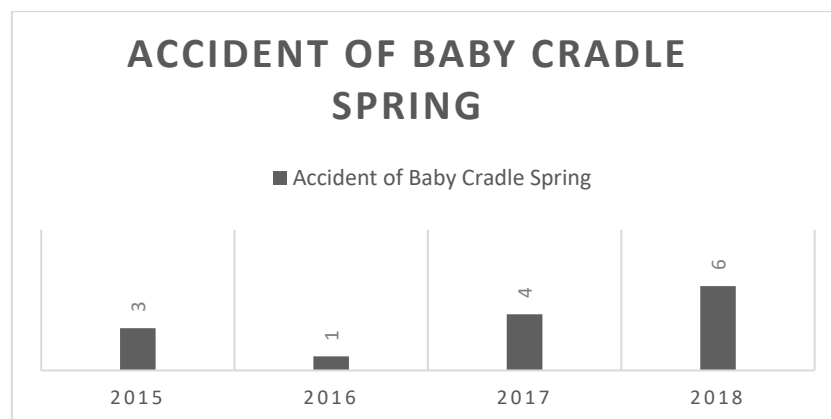


Figure 1.1: The chart of number accident using baby cradle in Malaysia.

The other problems that has been identified from survey data, the public listed the motor still swings the spring although the baby was awake and moves inside the cradle as the major problem when using the automatic baby cradle. When, the baby was awake and wanted to get down from the cradle while the motor still swings the spring, this kind of situation can lead the baby into the accident or fell from the cradle. Figure 2 below shows the pie chart of question with the answers about asking the public what is the most problem that they face when using the baby cradle. 63% of respondent choosing the motor still swing the spring although the baby was awake and moves inside the cradle as the most problem they're faces when using the cradle. Besides, 6% of respondent choosing the problem that the crutches almost fell onto the baby and 31% of respondent choosing problem the baby almost fell from the cradle.

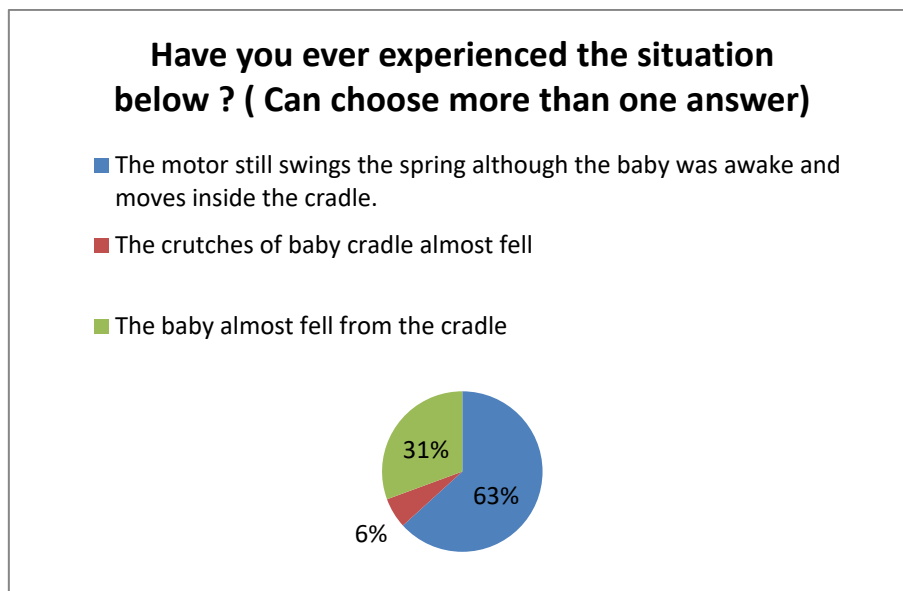


Figure 1.2: Number of respondents responded to the question “have you ever experienced the situation below?”

1.4 OBJECTIVE

As developing this project, some project objectives had been specified. The main purpose of this project is to add more safety feature to the baby cradle. Some objectives of this project had been identified and listed as below: -

1. To design and develop a prototype.
2. To reduce of any cases disjointed spring from the motor.
3. To test the effectiveness in helping and solving the problems.

1.5 SCOPE PROJECT

The scope of this project is only focusing on radio frequency 315Mhz. Radio frequency 315 MHz used as medium to inform the parents and the babysitter about what happen to the baby inside the cradle when the parents and the babysitter are do far away from the cradle or doing other things. This project will not working if the distance between the baby cradle and the alarm that the parents and the babysitter had exceeds the limit coverage area 100m because this project only working if the distance not exceeds 100m.

1.6 IMPORTANCE OF RESEARCH

This project is as the primary steps before entering the working situation or industrial practice. With this kind of experience in making this project successfully, the student will be more prepared with all kind emergency, high pressure and being professional in making decision or solving problems

The student also able to work as a group or a team and developed a high quality as a worker. Furthermore, the student will be more sensitive about the current issues and try to find a solution to solve the problem. Lastly, being innovative and creative is most likely what our country needs.

1.7 SUMMARY OF CHAPTER

Safety Baby Cradle Spring is a product that developed because every year the number of cases of accident when using baby cradle is increased slightly from year 2015-2018 at Malaysia.

Safety Baby Cradle Spring is a product to reduce cases that happened on the cradle involving the babies and bring a good solution to solve the problem. With proper observation and research, Safety Baby Cradle Spring is an innovation product which is will auto lock the spring by the censor vibration when there is too much movement that baby make in the cradle and as soon as possible inform the parents about the current situation that happening in the cradle using radio frequency 315 Mhz. This product is another better version than current baby cradle because the safety is the priority.

CHAPTER 2
LITERATURE REVIEW

PREPARED BY: DENNIS NAWIN ANAK EMPALING

2.1 INTRODUCTION

This study aims to figure out what is the problem when facing problem such as accident which is can leads to death, major and minor injury when using the baby cradle. In a study published in The Journal of Paediatrics in April, researchers analysed 47 infants and toddlers under the age of two while placed in sleeping, sitting and carrying devices such as the cradle, car seats, swings, bouncers and slings. Also, each year NUH (National University Hospital) children's emergency department treats up to 20 infants and young children under the age of two for such injuries, ranging from minor scrapes to more serious head injuries and limb fractures when using the baby cradle. The number of cases of accident using the baby cradle is slightly increased in every year and need to take quick-action to prevent the accident using the cradle happen in the next future.

2.2 THEORY

The baby cradle is a place where the place for to make the baby fall asleep. The baby is already used at 15th century. At that time, the wood cradles mounted on rockers was so popular and gradually superseded in the 18th and 19th centuries by sarong cradle that were slung between end supports in order to raise them higher from the ground. In much of the world, cradles were gradually replaced by the barred crib in the early 20th century.

The innovations and inventions always have been made on the baby cradle from times to times, due to safety factors of the baby when using the cradle. That's why there are various of type cradle that have been made by the researcher such as sarong cradle, rocking cradle, cot sleeping cots and stationary cribs.

Sarong cradle is popular and have been used for a long time at Southeast Asia country. Sarong cradle is a traditional suspended fabric sling (sarong) that acts as a hammock for the baby. Rocking cradles is a crib standing on a curved surface that lets the baby be rocked either by hand or electric motor.

Stationery cradle can be called as an ancient cradle because it's the first cradle have been introduced into the world and early at 15th century and still used nowadays. Stationery cradle is a

traditional cradle four-legged structure with a sunken bed surrounded by bars. Co-Sleeping Cots is a crib that can be placed beside the adult's bed with one side lowered as a flap.

This study will help to minimize and reducing the accident when using the baby and find out the ways and solutions. The redesign and the innovation will be doing in the field to solve the accident when using the baby cradle by enhances the safety factors to provide the safety environment towards the baby. The literature review below will describe the solution in reducing the number of accident when using the baby cradle in Malaysia.

2.3 PREVIOUS RESEARCH

The baby cradle can be found in many types in different innovation and invention to more advance than before includes manual to automatic. So, this previous research is mainly separated into Sarong cradle, Stationary cradle cribs, and Bassinet Cradle.

2.3.1 Sarong Cradle

Sarong cradle can be found in 2 types such as manual and automatic. The manual sarong cradle is a traditional type that has been used for many generations. The manual sarong cradle needs a man power to swing the spring. Figure 3 shows the manual sarong cradle.

The automatic sarong cradle is one kind of advanced technology nowadays, it's computerised which is means the whole operation process of the cradle by receiving the information/signal. It's using the electric source as the main power to start the motor and it's clearly does not use the man power to swing the spring. The timer and speed are can be controlled by adjusting it to avoid Shaken Baby Syndrome (head injury – brain damage). Figure 4 shows the automatic sarong cradle.



Figure 2.1: The manual sarong cradle.



Figure 2.2: The automatic sarong cradle.

2.3.2 Stationary Cradle Cribs

Stationary cradle crib is one of the cradles that has been using for a long time since 1600s – 1800s. So, the system of this cradle has been developed and evolved from times to times. Below is the chronology of how the cribs made:

Chronology of the cribs: -

1600s - 1800s - Some early American babies slept in hollowed-out logs. Others were lulled to sleep in simple pine rockers.

Early 20th Century - In the early 1900s parents began using elevated cribs to keep babies away from the cold ground. Wicker cribs were common but not the most comfortable. Iron beds were considered the most sanitary protecting babies from bed bugs and other critters while exposing them to lead paint and other toxic materials!

1920s - Baby "cages" became popular in the 1920s after Eleanor Roosevelt hung a chicken wire cage out the window for her child to nap in.

1950s - In post-WWII years, cribs start to resemble modern ones but without safety precautions.

1973 - The U.S. Consumer Product Safety Commission develops the first federal crib safety standards.

1987 - Graco invents the Pack N' Play, a portable bed that makes sleep on-the-go more convenient.

Late 1990s - Stokke introduces a crib that can be converted into a bed for a child up to 10 years old.

2010 - New guidelines require ALL cribs to comply with national safety standards.

So, the cribs have been invented and innovated to be a better space for a baby or children to sleep. Marie R. Harper (30-05-1972) invented a crib adapted to be rocked automatically. Once the crib is manually tilted in one direction and released, this permits the inertia to actuate the locking and actuating arms to operate under the biasing force of spring in conjunction with the gear. Thus, spring loaded motor begin to operate and the lever arm is oscillated in back and forth movement. This provides the same effect as would be achieved by the mother rocking the crib containing the baby. Oscillation of crib is stopped when the slightest resistance is incurred.



Figure 2.3: The stationary cradle cribs.

2.3.3 Bassinet Crib

A bassinet is typically a basket like structure on free standing legs, often with casters. A cradle id typically set in a frame, but with the ability to rock or glide.

So, Yang Hu (16 – 09 – 1972) has proposed an algorithm for adjusting the bassinet swaying extent by the sensor signals. The bassinet is made up of an adaptive swaying device and other sensors network. While baby is crying, the sensors network can judge the reason according to detecting parameters, giving the different signals to control circuit. At the same time, the bassinet starts to

sway slightly. The swaying rhythm can be adjusted according to parameters from baby status. They used three pressure sensors located in the bassinet bottom, one at the centre and others at left and right of the bottom.



Figure 2.4: The bassinet crib

2.3.4 Related Works

Below are related works that have been done by a few people that are related to this project literature reviews.

1. Steven Bang (07-05-2011)

- Steven Bang has designed automatic baby rocker having a noise sensor to detect baby cry. Noise sensor consists of Electric MIC with a pre amplifier (2n3904 transistor). Signal from noise sensor is fed to microcontroller Arduino ATmega 328, which is used to control the DC motor. Few colourful lights made up of LED are used to entertain the baby while being rocked. Mabuchi RE-260RA DC motor with Tamiya 6 speed gear box is used to create the rocking motion of the crib with gear ratio of 505.9:1.

2. Anritha Abenezzer (30-05-1972)

- Anritha Ebenezer proposed an automatic swinging system having a microphone to detect the baby cry and which converts the sound signal to electrical signals

which are then amplified by the amplifier and then sent to peak detector where cry peaks detected and further sent to microcontroller. Microcontroller controls the signals to be sent, then the output of which is sent to drivers which drives the Dc motor and makes the cradle to swing according to sound intensity.

3. Gim Wong (27-04-1976)

- Gim Wong presented an Electronic device that can be attached to conventional pivotally mounted type crib which is actuated by baby cry voice picked up by the microphone giving short throw type rocking action to crib. Very similar to a person rocking the crib by pushing and pulling on the foot or headboard. There is a sensitivity control so that baby voice only actuate the rocking action and a timer to control the duration of rocking action

2.4 SUMMARY OF CHAPTER

At the end of this chapter, it is clear that the theory and the previous research about the baby cradle is explaining every inch of the baby cradle transformation from manual o automatic. Mostly, the baby cradle lightened the burden that parents need to carry where its help most the parents to keep and make it the baby sleep easier while they're busy and got a lot of work to do.

Although the innovation of baby cradle keeps progressing, through the theory and the previous research prove that every innovation of baby cradle does have any weaknesses that is need to take an action before it encourage any accident occurs involving the baby or kids when sleeping in the cradle.

CHAPTER 3

METHODOLOGY

PREPARED BY: STEPHENIE WOO

3.1 INTRODUCTION

Methodology is a matter of how the project is produced. It includes the components used, the procedures and techniques used for the product. Methodology explains the way a problem is investigated and why a method and technique are used. The purpose of this methodology is to help understand more in detail by applying the method by making a description of the study process.

The aim of the research methodology used to derive the appropriate data so that the study could continue to the next step. The preliminary investigation is one of the study collection, processing and analysis of data conducted in a systematic and efficient way to solve a problem. Thus, the purpose of this study was to obtain answers through the use of a scientific step with systematically and scientifically. This chapter will briefly explain some important aspects in relation to the methodology used in this study. Concentration in this chapter will be given to study this project. In addition, this chapter will describe the procedures, procedures and programs for the implementation of the study.

3.2 FLOW CHART

To make this project a success, several steps need to be taken and must be followed to ensure that the project will be smooth and successful. In case of problems, this flow chart should be referred to assist before or during the project. with this flow chart it encourages the use of a more orderly and systematic time because it can follow all the directions in so accurate and perfect. Among the steps that need to be followed are as follows:

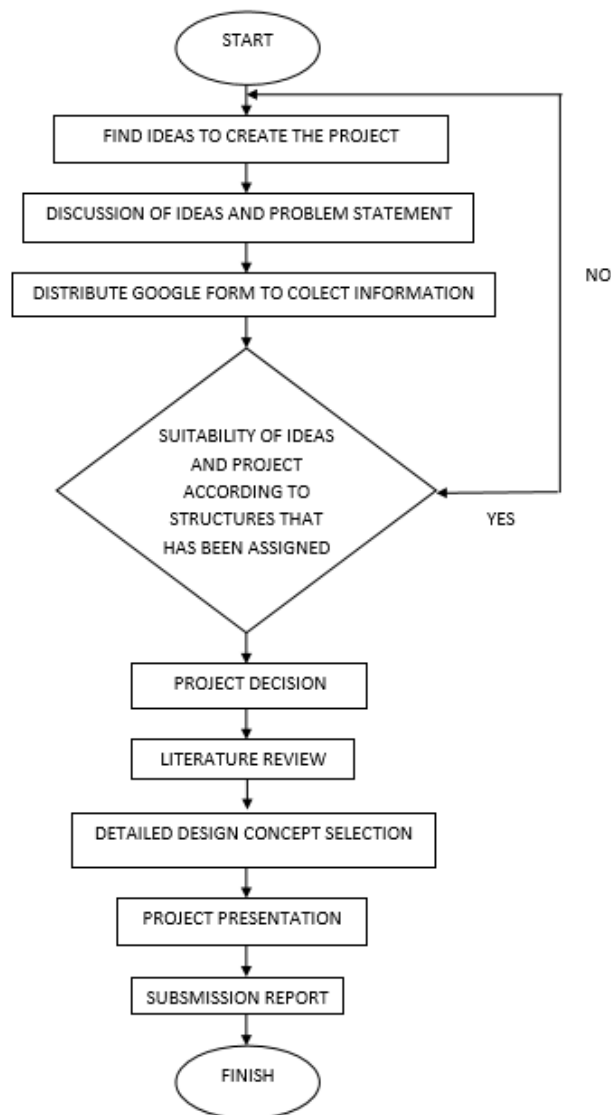


Figure 3.1: Flow chart process

3.3 SURVEY COLLECTION METHOD

The third method use to obtain the information about this project is survey questionnaire method. Survey questionnaire method is a method that can be performing face-to-face through distribution of set of survey questions or through online. Those who take the survey are allowed to keep their identity anonymous. It usually requires having sample population of people to take the survey in order to obtain the result accurately. The larger the total number of people who take the survey, the more accurate the result will be. The result obtained then will be perform probability calculation to make it easier to analyze and turn into final useful information.

There is some strength that can be found from the survey questionnaire method which one of the strengths is that the surveyors do not need to know who has respond to the survey. They do not need to record the personal data who had taken the survey one-by-one. In addition, those who take the survey will not need to worry while they are answering the question since their identity can be in anonymous. People are tending to answer question more honestly when their identity is not exposed. In addition, survey information allow surveyor to turn it into sampling data that can be easily analysis through some data sampling technique.

Therefore, survey questionnaire method will be applied to this project in order to make the data analysis can be performed easily. In using survey method, it can help to fasten the process of gather information compare to observation since many people can perform the survey at the same time while observation required more time to truly observe the thing clearly with no doubt. Survey method has help in knowing the student opinion more clearly regarding the current existing system.

Based on survey for this project, there are 50 respondents from survey that had been carried out. Most of the respondents are parents, babysitter and others such as family members. 24 of respondents are the parents, 18 of respondents are the babysitter and 8 of respondents are the family members. The survey lists two types of baby cradle spring, which are auto and manual. 30 of respondents use manual type of baby cradle spring while 20 other respondents use auto baby cradle spring. This survey is also about the accident while using baby cradle spring. There are 66% of respondents have seen or read the new about safety factors when using baby cradle spring. Besides, there are 34% of respondents never seen or read the new about safety factor baby cradle spring.

There are 15 of respondents experienced that the baby almost fell from the cradle and 4 of respondents experienced that the crutches of baby cradle almost fell. Furthermore, 30 of respondents experienced that the baby dropped himself out of the cradle. In a nutshell, there are 94% of respondents needs an extra safety and 6% of respondents do not need extra safety on their baby cradle. For the result survey, adding safety to the existing baby cradle such as auto-lock spring and send signal had been made. The result of the survey is 35 of the respondents agree about adding safety features on the current baby cradle while 5 of respondents disagree.

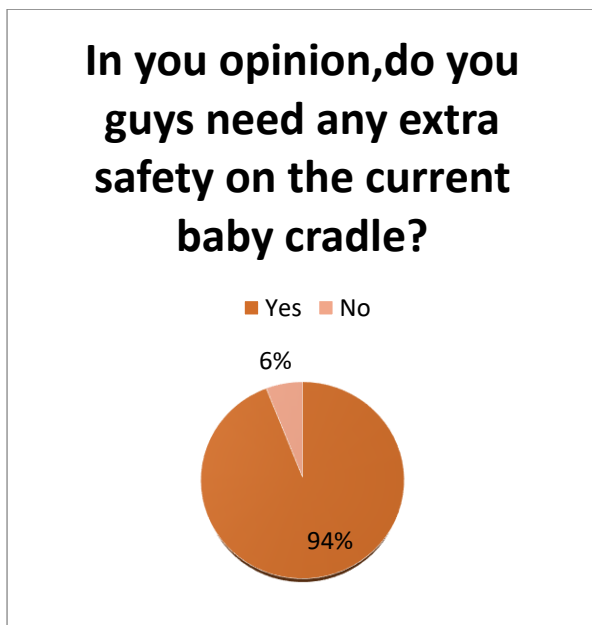


Figure 3.2: Survey about needed extra safety on the current cradle

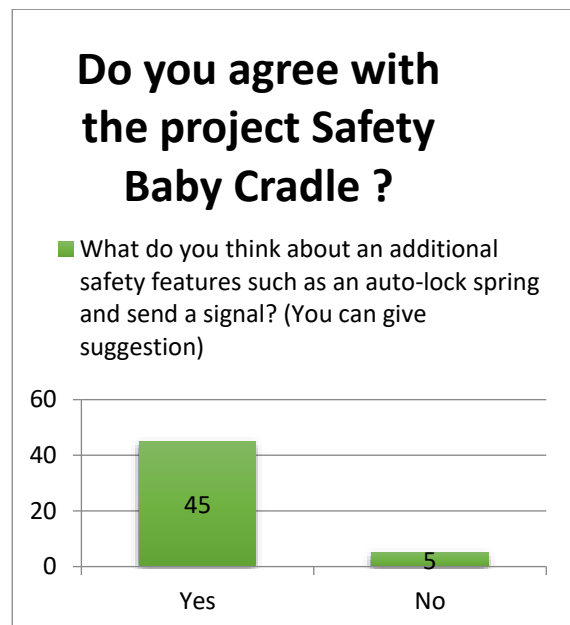


Figure 3.3: Survey about an additional safety feature

3.4 SAFETY BABY CRADLE COMPONENTS

3.4.1 Component Inside Casing Box

Figure* and * shows the component that has been used in the casing box and remote alarm.

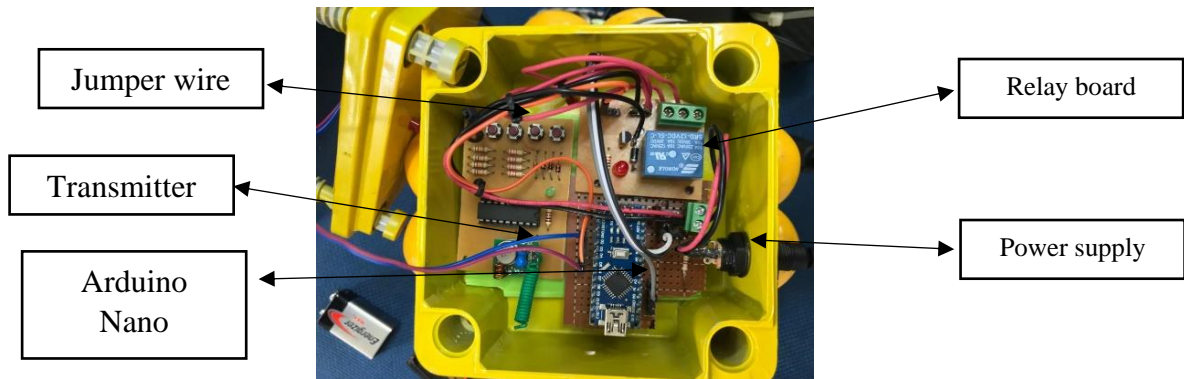


Figure 3.4: Component inside casing box



Figure 3.5: Components inside the remote alarm

3.4.2 Components

i. Type of sensor that has been used



Figure 3.6: Vibration sensor

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge.

ii. Arduino Nano

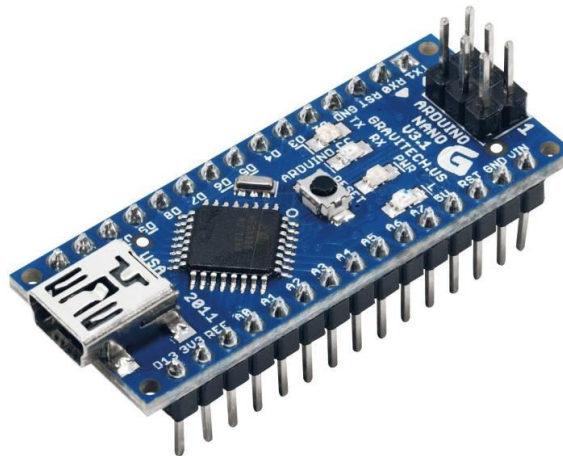


Figure 3.7: Arduino Nano (3.0)

Arduino Nano is a microcontroller board developed by Arduino.cc and based on Atmega328p. Arduino consist of both a physical programmable circuit board and a piece of software or IDE (Integrated Development Environment) that runs on computer, used to write and upload code to the physical board

iii. Transmitter and Receiver

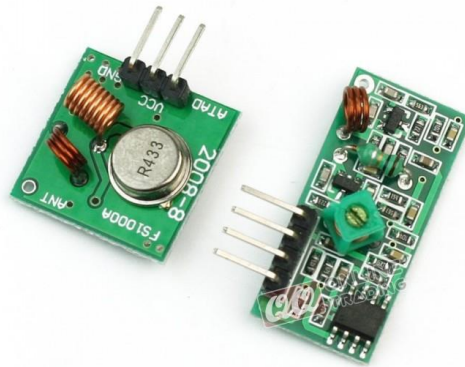


Figure 3.8: Radio Frequency 315MHz

A transmitter and a receiver combined in one unit is called a transceiver. The term transmitter is often abbreviated "XMTR" or "TX" in technical documents. ... The transmitter combines the information signal to be carried with the radio frequency signal which generates the radio waves, which is called the carrier signal.

iv. Buzzer



Figure 3.9: Piezo buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

v. **Coin Vibration Motor**



Figure 3.10: DC 3V 70mA 1200RPM Mobile phone coin flat

Vibration coin is a compact size coreless DC motor used to inform the users of receiving the signal by vibrating, no sound.

vi. **Power Supply**



Figure 3.11: Battery 9V

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. 9v battery has been used for the power supply of remote alarm.

vii. Relay Board



Figure 3.12: Single relay board 12VDC

Relay boards are computer boards with an array of relays and switches. They have input and output terminals and are designed to control the voltage supply. Relay boards provide independently programmable, real-time control for each of several onboard relay channels. A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current.

viii. Casing Box



Figure 3.13: Casing box

Casing boxes are usually made from rigid plastics, metals, particularly stainless steel, carbon steel, and aluminum. Mass-produced equipment will generally have a customized enclosure, but standardized enclosures are made for custom-built or small production runs of equipment.

3.5 DESIGN SPECIFICITON

3.5.1 Technical Drawing of Casing Box

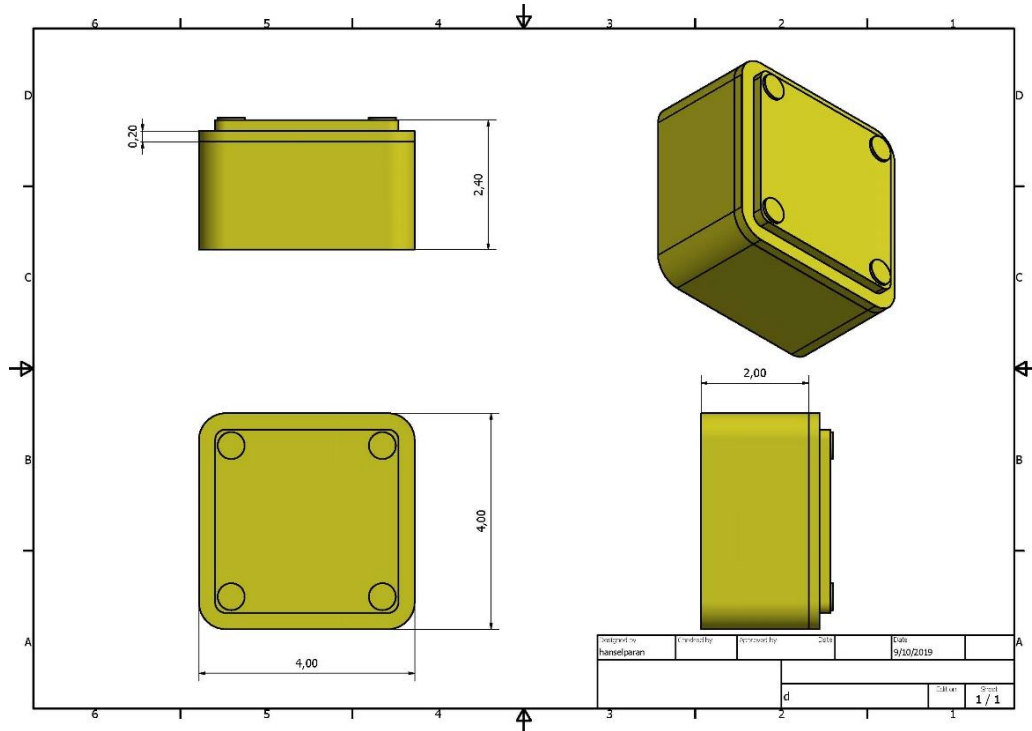


Figure 3.14: Technical drawing of Casing box

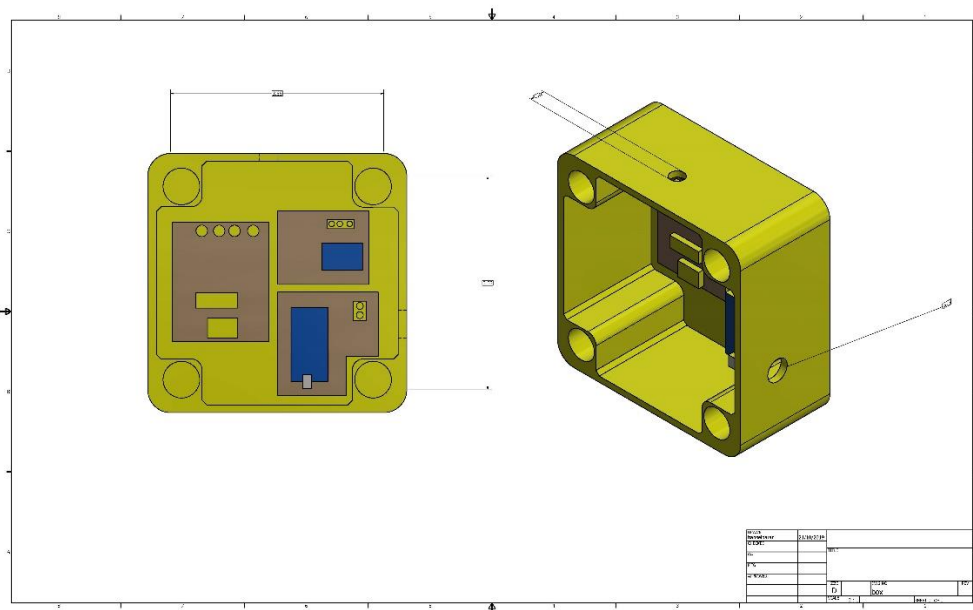


Figure 3.15: Technical drawing inside the casing box

3.5.2 Technical Drawing of Remote Alarm.

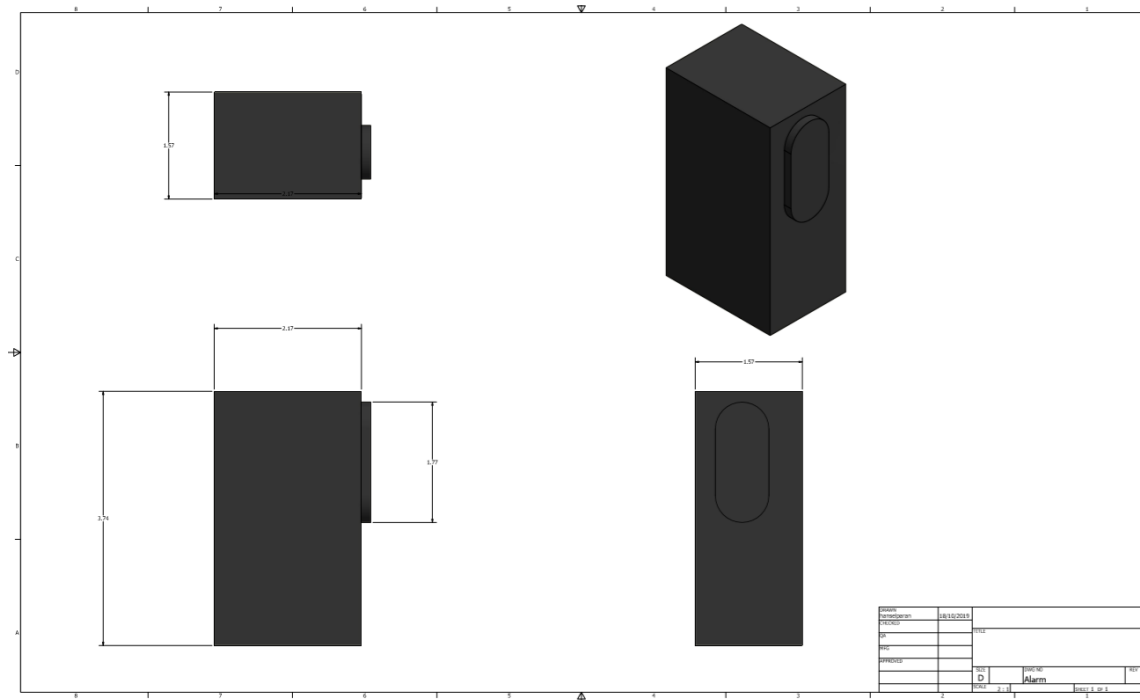


Figure 3.16: Technical drawing of remote alarm

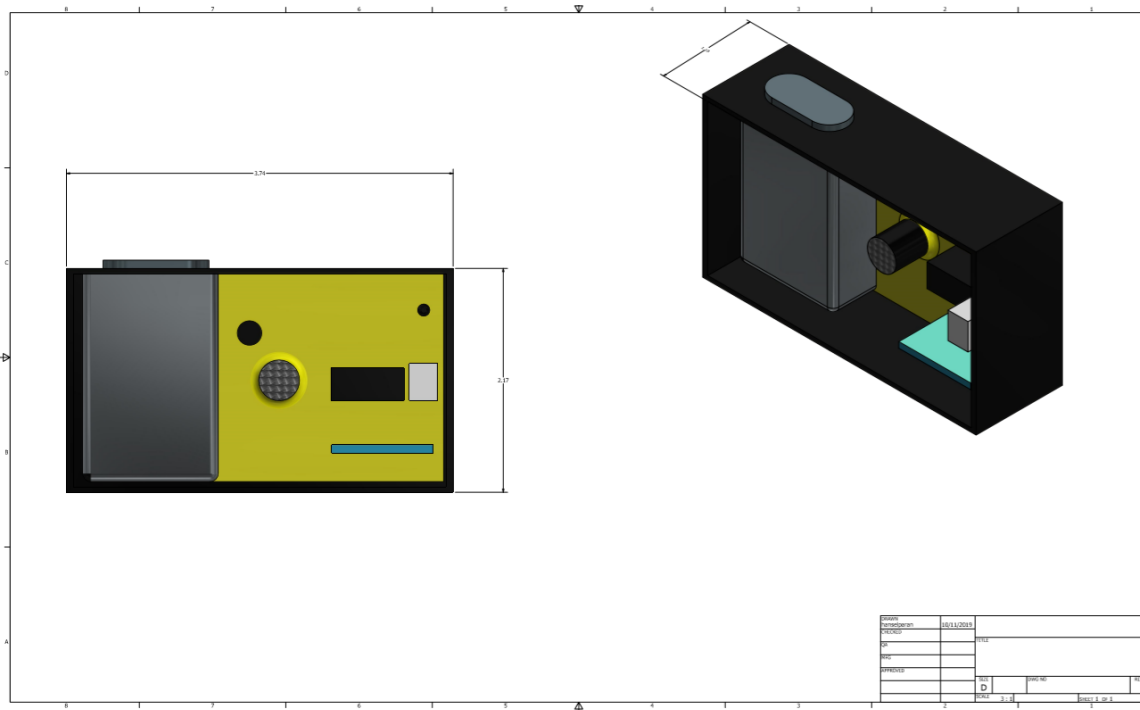


Figure 3.17: Technical drawing inside the remote alarm

3.6 THE FINISHING PPROJECT



Figure 3.18: Front view Safety Baby Cradle

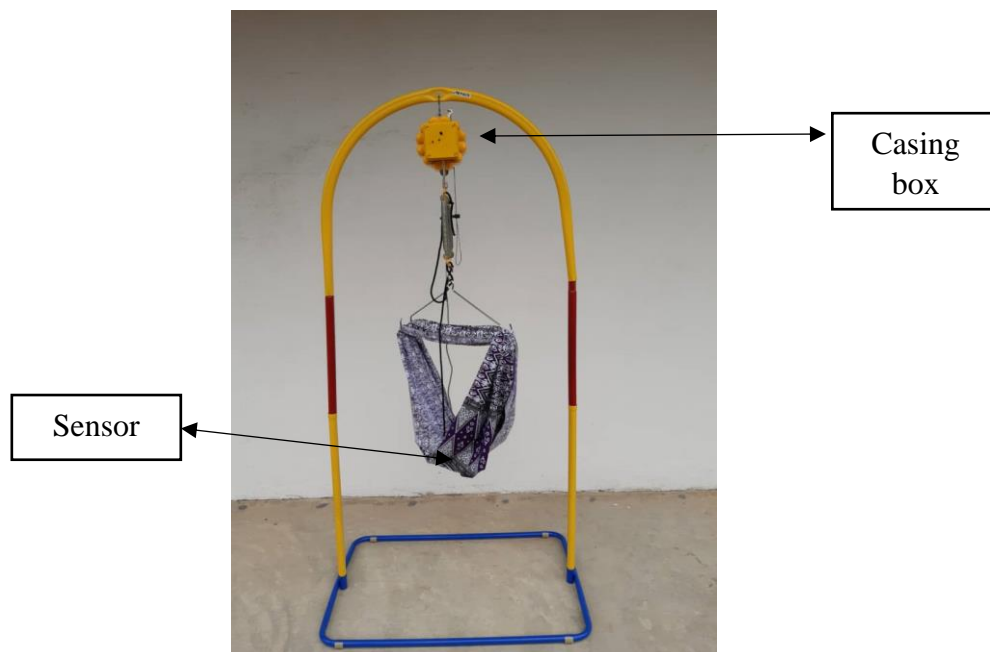


Figure 3.19: Back view Safety Baby Cradle

3.7 PROCESS FUNCTIONAL

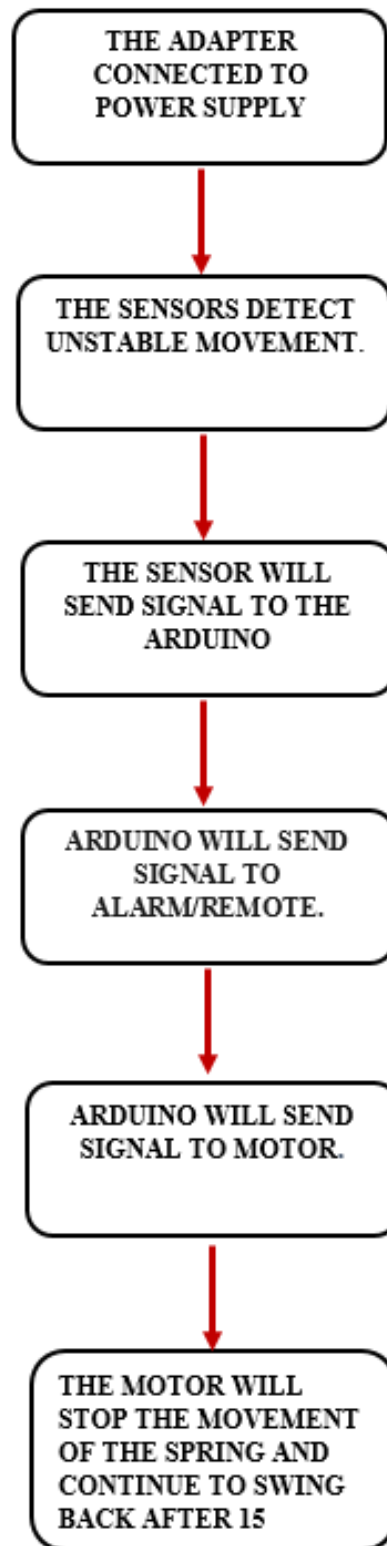


Figure 20: Working Procedure

Firstly, switch on the plugs as in figure 7. The cradle will start moving when the adapter successfully connected to the power sources. The motor will start move the spring according to the speed and timer has been set and the vibration sensor will start detecting any unstable movements in the cradle. If any unstable movements successfully detected in the cradle as in figure 8, the vibration sensor will send the signal to the Arduino Nano in the yellow square box. Red light will be shown as in figure 9 on yellow box if the Arduino Nano successfully received the signal from sensor vibration and the Arduino Nano will send the signal to motor. The motor will stop the spring from moving for 15 second. As the cradle stop from moving, Arduino Nano will send the signal to the alarm via Radio frequency 315mhz and the alarm will be ringing if successfully received the signal from Arduino Nano. After 15 seconds, the motor will swing the cradle back again.



Figure 3.21: The adapter successfully connected to plug



Figure 3.22: Before and after the vibration sensor detects any movement in the cradle

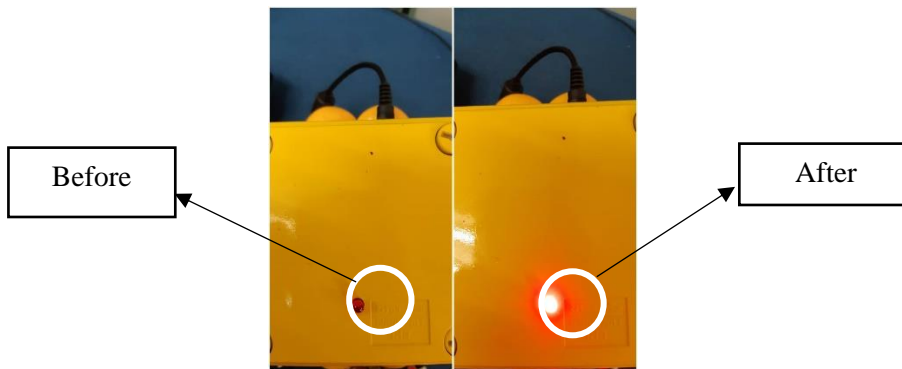


Figure 3.23: Before and after yellow box successfully receives signal from sensor vibration

3.8 CIRCUIT DIAGRAM

A circuit diagram is a graphical representation of an electrical circuit. A pictorial circuit diagram uses simple images of components, while a schematic diagram shows the components and interconnections of the circuit using standardized symbolic representations.

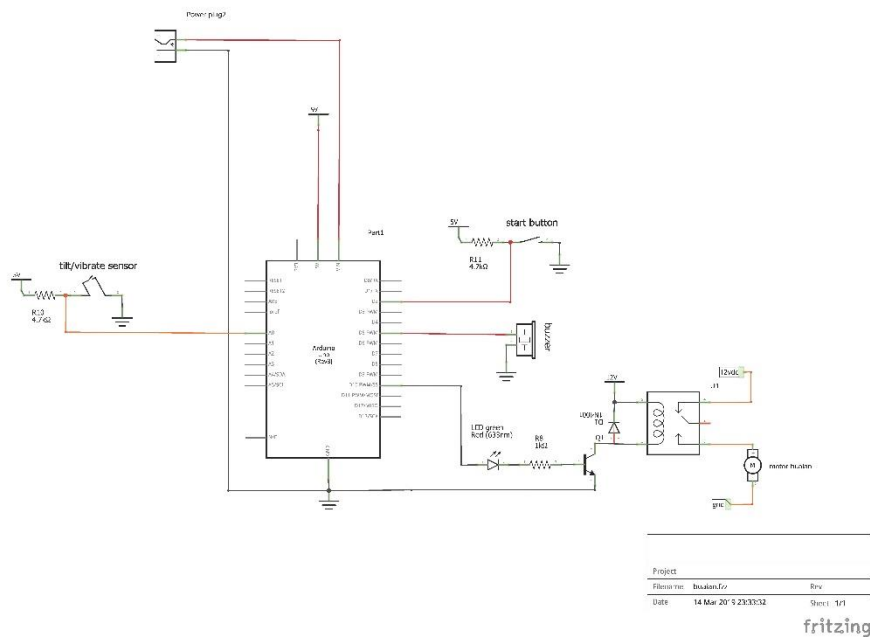


Figure 3.24: Circuit diagram of safety baby cradle

3.9 PROGRAMMING APPLICATION

Arduino programs are written in the Arduino Integrated Development Environment (IDE). Arduino IDE is a special software running on your system that allows you to write sketches (synonym for program in Arduino language) for different Arduino boards.

The Arduino programming language is based on a very simple hardware programming language called processing, which is similar to the C language. After the sketch is written in the Arduino IDE, it should be uploaded on the Arduino board for execution.

```

ampson_Auto | Arduino 1.8.8
File Edit Sketch Tools Help

ampson_Auto
#include <LiquidCrystal.h>
#define M1a 10 //MOTOR1
#define M1b 11 //MOTOR1
#define LIMIT1 2
#define LIMIT2 3

LiquidCrystal lcd(8, 5, 4, 5, 6, 7);

int TIMER1a=0;
int TIMER2a=0;
int MOVE007=0;

float BUJAN=0;
float LSR=0;

float Sens1;
int Sens1Pin = 0;
float Sens2;
int Sens2Pin = 1;

void setup() {
  Serial.begin (9600);

  pinMode(M1a, OUTPUT);
  pinMode(M1b, OUTPUT);
}

int main() {
  while(1) {
    // Serial.println(0x00); // prints the value of the sensor to the serial monitor
    delay(100); // wait for the data to be read
    int sensor1 = 0;
    int sensor2 = 0;
    Serial.println("MOTOR OUT");
    Serial.println(MOVE007);
    while (digitalRead(Sens1Pin) == HIGH) {
      digitalWrite(M1a, LOW);
      digitalWrite(M1b, HIGH);
    }
    digitalWrite(M1a, HIGH);
    digitalWrite(M1b, LOW);
  }
}

```

Figure 3.25: Coding program using Arduino software

3.10 SUMMARY OF CHAPTER

In conclusion, the block schedule and flow chart for coding that we have implemented for the project has been outlined shortly in this chapter. This coding enables the relevant project output level to be developed, which also comprise all crucial parameters from debugging and encoding to testing and executing.

CHAPTER 4

RESULT & ANALYSIS

PREPARED BY: DENNIS NAWIN ANAK EMPALING

4.1 INTRODUCTION

Result and analysing is a research to get the information about the project. In this chapter, it will be discussing on the result, findings and the assessment from the analysis that have been conducted in this project.

After the implementation of the Safety Baby Cradle was successfully done, this project will be analysis to measure the effectiveness and to ensure the main objectives of this project successfully achieved. In the other hand, it's important for this product to be get valued by the customer such as the parents and the babysitter because they're are our target in the market strategies.

The result at the end of this project is really important because before entering local market or international market, this project must function well and get any verified certified such as SIRIM (Standard and Industrial Research Institute of Malaysia), ISO (International Organization for Standardization). With this kind of certified verification, the customer will get to know that this project is safe to use and have been through a long testing before entering the market.

4.2 RESPONDER RATES

A total of 30 questionnaires were given to the respondents to get the feedback about after implementation of the project which is Safety Baby Cradle. The respondents are including the parents and the babysitter which is from public respondent. Out of 30 questionnaires, only 26 were returned which is it represent 87% out of 100% the responder's rates. Although, only 26 questionnaires returned, it's seems to be enough for further analysis.

4.3 DEMOGRAPHIC PROFILE

Basic information for 26 respondents from the questionnaire shows that the respondents consist of 13 parents and 13 babysitters which respond to the feedback form that had been given to the public.

In terms, 2 of parents and 4 of babysitter are agrees and 11 of parents and 9 babysitters strongly agree that this cradle is easily to use and none of both categories disagree nor of them strongly disagree. To wrap the feedback forms, result, all of the parents and babysitters are agreeing and strongly agree on developing Safety Baby Cradle which emphasize safety features really help the parents and the babysitter to using the baby cradle in daily life to take care of their child.

4.4 RESEARCH FINDINGS

Research findings are related to the results of this study. The result should contain result of analysis required to report systematically, review clearly and good interpretation with objective, questions and hypothesis research. Research finding will be reported in the form of tables, figures and interpretations that will answer to the research question

Feedback 2

Table 4.1: The table of feedback 2

Question No.	Strongly Disagree		Disagree		Agree		Strongly Agree	
	Parents	Babysitter	Parents	Babysitter	Parents	Babysitter	Parents	Babysitter
1.0	0	0	0	0	3	5	10	8
2.0	0	0	0	0	2	4	11	9
3.0	0	0	0	0	1	2	12	11
4.0	0	0	0	0	3	4	10	9
5.0	0	0	0	0	1	3	12	10
6.0	0	0	0	0	2	2	11	11
7.0	0	0	0	0	3	3	10	10
8.0	0	0	0	0	3	4	10	9

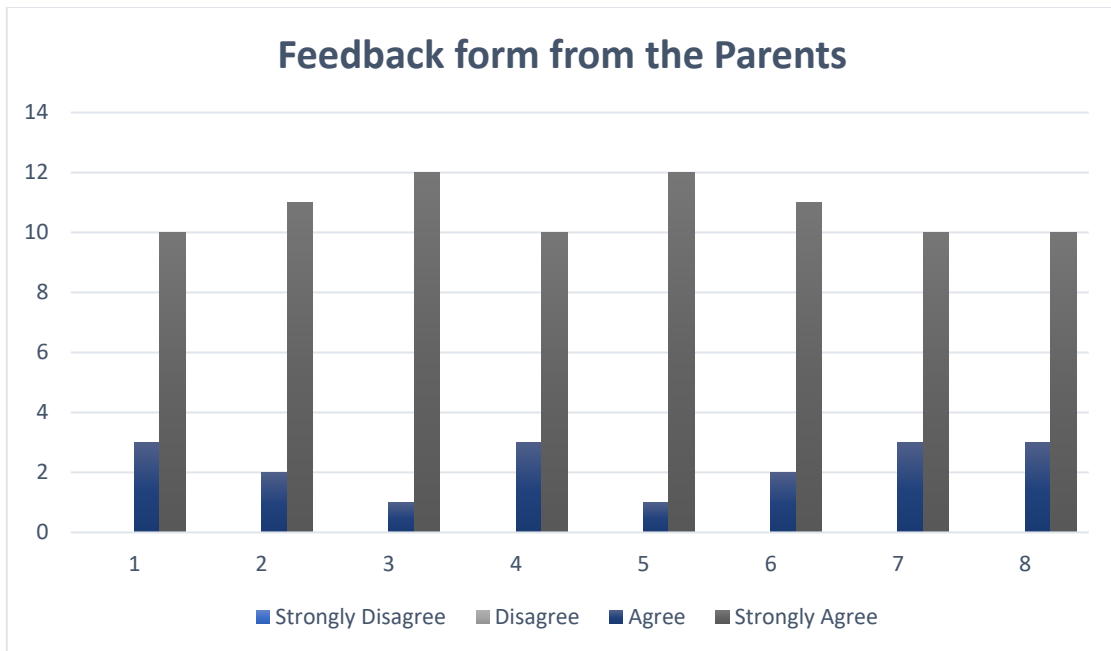


Figure 4.1: The feedback 2 form graph category parents

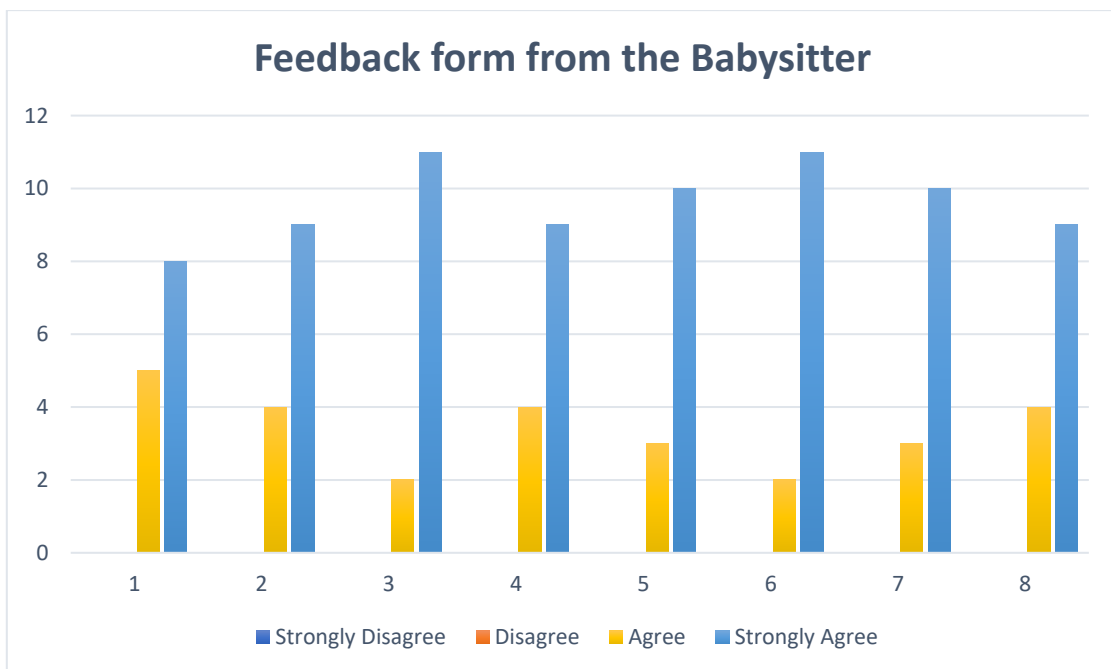


Figure 4.2: The graph of feedback forms 2 category babysitter

Based on after implementation project survey, there are about 26 respondents from survey carried out. Most of the respondents are parents and babysitter and they are really satisfied with this product. 2 of parents and 4 of babysitter are agrees and 11 of parents and 9 babysitters strongly agree that this cradle are easily to use. Besides, 1 parent and 2 of babysitters are agrees and 12 of parents and 11 of babysitter are strongly agree that the problems that they're facing when using baby cradle is solved.

From the survey, 3 of parents and 4 of babysitter are agrees and 10 of parents and 9 of babysitter strongly agree that this product have made their daily life more convenient s. 1 parent and 3 of babysitter are agrees and 12 of parents and 10 babysitter strongly agree that this product helps them in making quick action in such emergency situation. The question “ does this product enhance the safety factor of baby while in the cradle?” most of them strongly agree and consist 11 of parents and 11 of babysitter while 2 of parents and 2 of babysitter are just agree. 3 of parents and 3 of babysitter are agrees and 10 of parents and 10 of babysitter strongly agree that this product need more recognition by the worlds with recommends this product to the others. Besides, 3 of parents and 4 of babysitter are agrees and 10 of parents and 9 of babysitter strongly agree that this product should be commercialize at any markets as this product useful.

Some of the respondents recommended that the cradle should be more portable by using apps to control all the function of the cradle. Lastly, the respondents also recommended that the cradle should be more in advance by using rechargeable battery or solar energy to replace the electric source. With replacement of rechargeable battery or solar energy, the cradle can be easily to use at everywhere without the electric source.

4.5 SUMMARY OF CHAPTER

In this chapter, it's explains about result that have been collected from the parents and the babysitter about their thoughts on developing existing Safety Baby Cradle which will help the parents and the babysitter in enhances the safety factor of baby while in the cradle. The total result shows that most of the respondents found that by developing existing baby cradle to an improved one which is Safety Baby Cradle will enhance the safety of the baby while in the cradle with advance technology system to assist the parents in taking cares of child's safety.

Besides, this chapter will explain about the conclusion of this project, discussion on how the previous research related to the Safety Baby Cradle, and suggestion to improve this project so this project will be better and precise in safety of the baby while in the cradle.

CHAPTER 5

DISCUSSION & CONCLUSION

5.1 INTRODUCTION

This chapter will explain about the discussion and conclusion for this project. How Safety Baby Cradle help visually parents to detecting unstable movement and send signal to parents. The conclusion is, this project is successfully being innovated and achieve the objective. With this innovation of Safety Baby Cradle, many problems that been faced by parents or babysitter have been solved. The discussion about this project is how Safety Baby Cradle related with literature view that has been made by researcher. In this chapter, there will be more explanation for discussion and conclusion of Safety Baby Cradle.

5.2 DISCUSSION

Based on the literature review that have been made on chapter 2, many explanation and researches has related in this project. The first study is baby cradle research, in this study describes the purpose of cradle, types of cradle, the consumption of each kind of cradle and design of the cradle. This study is related to this project when the main objective of this project is to reduce accident cases involving babies.

Next, the problems with Baby Cradle. This study aims to improve understanding and knowledge on solving the problem in existing cradle. Besides that, through the study of baby cradle components. This study was conducted to examine the strength or power and advantage of the components. Both of this literature review, it has been related to the project by showing visually parents or babysitter how to improve their confidence when using baby cradle.

5.4 CONCLUSION

In conclusion, safety is the most important aspect that should always be emphasize and point up in our daily life. As parents, their children are their priority in life and that should make a big concern to them if their children especially baby are always exposed to danger while they are in baby cradle. By proposing an advanced baby cradle which focus on safety of the baby, this will help reducing the accident of baby falling from cradle. This is because, the parents are more alert when they are doing their chores and work by hearing alarm if the baby is moving. As shown in our survey, most the respondents agree on inventing the existing baby cradle to a safer one. Apart from that, the testing that we had conducted also shows a positive result where the spring stop swinging as the vibration sensor detects movement on the baby cradle and the alarm rings as soon as the sensor detect movement. This prove that this project gives positive impact in our daily life especially parents where parents no longer worry on accident that will happen to their baby while on the cradle.

5.5 RECOMMENDATION

The current features of safety baby cradle spring are remote alarm. It is a hardware to the parents or babysitter whom take care of the baby as if there is movement of the cradle. The spring will slowly stop and will trigger the alarm. For the future improvement, invent an app for the baby cradle spring. The app will have some special features such the speed of the cradle. The app can control the speed of the cradle. The app will connect by wireless. It will use Bluetooth. It will easy to monitor the baby's movement in the cradle as the apps will show the speed of the cradle.

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APPENDIX A

Bayi mengalami pendarahan dalam otak selepas terjatuh dari buaian



MELAKA - Seorang bayi lelaki berusia setahun enam bulan mengalami pendarahan dalam otak akibat terjatuh dari buaian.

Dalam kejadian 23 Mei lalu, Muhammad Adam Hadiff Muhammad Faiz, dilaporkan tidak sedarkan diri selepas terjatuh dari buaian, petang hari kejadian, dikejarkan ke Hospital Kuala Lumpur (HKL) untuk

Bayi meninggal tersembam ke bantal dalam buaian

Astro Awani | Ogos 02, 2017 18:44 MYT



Menurut ibunya, bayi malang itu baru pandai meniarap beberapa hari lalu. - Foto Astro AWANI

GEORGE TOWN: Seorang bayi lelaki berusia empat bulan meninggal dunia dipercayai akibat kesukaran bernafas apabila mukanya tersembam ke bantal ketika tidur di rumah keluarganya di Teluk Kumbar, Bayan Lepas, hari ini.

Kejadian disedari ibunya, Melati Mohammad @ Ahmad, 32, yang baru pulang dari kerja di kilang kira kira jam 7.30 pagi Rabu.

Menurut Melati, anak bongsunya itu, Faris Rayyan Qhumainy, berada di rumah bersama suaminya, Faizul Firdaus.

Bayi 10 bulan 2 terjatuh dari buaian di rumah pengasuh, meninggal dunia



Bayi lelaki berusia 10 bulan yang dilaporkan cedera parah di bahagian kepala dipercayai terjatuh di rumah pengasuh, meninggal dunia selepas empat hari bertarung nyawa, lapor [Bernama](#).

7 months boy baby fell down accidentally from cradle twice in the same week..



0 To 1 Years

Created by [redacted]
Updated on Apr 17, 2017

7 months boy baby fell down accidentally from cradle twice in same week.. first time he cried for 5 min n settled.. second time he fell from cradle while swinging n cried for 15 min and found swelling in the forehead .he behaved normal in both the scenario s... do I need to worry r need to take any test to confirm by his health



HIBURAN | VIRAL

Anak Tergolek Jatuh Buai Tapi Sibuk Nak Ambil Gambar, Linda Hashim Dipertikai

On May 28, 2019

astro
AWANI

BERITA VIDEO FOTO LIVE

Bayi parah selepas jatuh dari buaian
Polis tahan seorang wanita bagi bantu siasatan bayi lelaki 10 bulan yang...

Share

BAYI PARAH SELEPAS JATUH DARI BUAIAN

Polis tahan seorang wanita bagi bantu siasatan bayi lelaki 10 bulan yang parah dipercayai terjatuh dari buaian. Wanita berusia 35 tahun itu mengasuh bayi berkenaan di rumahnya Tangkak.

10-month-old baby found face down in cradle

SUNGAI BULOH: "I broke down when I saw his face and body had turned blue. My mother's instincts told me he was gone," said Nur Syazwanie Mustaffa, 27.

The financial consultant said her 10-month-old baby, Mikhael Sufyan Muhammad Syafiq was found lying face down and unconscious in a spring cot cradle at his babysitter's home.

He was sent to a clinic at 10am last Friday.

Nur Syazwanie, a mother of two, said she and her husband, Muhammad Syafiq Mohd Salleh, 27, had rushed to the clinic after she was alerted of the incident at 11am.

"The babysitter, who is in her 50s, and her daughter, who is in her 30s, informed me that they found Mikhael face down in the cradle around 10am.

"The babysitter claimed that after bathing Mikhael, she had placed him in the cradle to sleep with his face down. "When she checked on him 30 minutes later, he was unconscious and his body was cold," Nur Syazwanie said at her home in Bandar Seri Coalfields here today.

She said a doctor at the Sungai Buloh Hospital emergency unit had examined Mikhael and pronounced him dead. The child's body was taken to the forensic unit for a post-mortem.

MUAR: Seorang bayi lelaki 10 bulan yang parah pada kepala dipercayai terjatuh di rumah pengasuh, meninggal dunia selepas empat hari dirawat di Hospital Pakar Sultanah Fatimah (HPSF) di sini, kira-kira 9 pagi Sabtu.

Bapanya, Nabil Fikri Anwar, 28, memaklumkan perkara itu melalui aplikasi Whatsapp berkata, Naufal Amsyar, yang juga bayi tunggalnya itu telah pulang ke rahmatullah.

"Assalamualaikum. Mohon sedekahkan Al-Fatihah buat anak saya Naufal Amsyar Bin Nabil Fikri yang telah kembali ke rahmatullah pada 9 pagi tadi," katanya.

Selasa lepas, bayi malang yang dijaga seorang pengasuh wanita berusia 35 tahun di Tangkak itu dimasukkan ke hospital selepas dipercayai diserang sawan.

Hasil pemeriksaan awal mendapati terdapat kesan lebam lama dan baharu pada dahi kiri bayi selain pendarahan pada bahagian mata serta keretakan tempurung kepala.

Susulan daripada itu, Khamis lepas polis menahan pengasuh terbabit bagi membantu siasatan.

Kes disiasat mengikut Seksyen 31(1)(a) Akta Kanak-Kanak 2001, yang memperuntukkan hukuman denda maksimum RM20,000 atau penjara hingga 10 tahun, atau kedua-duanya, jika disabit kesalahan.

Menurut laporan **The Star**: ALOR SETAR: Seorang bayi lelaki berusia 16 bulan meninggal dunia akibat tercekik tali putingnya selepas dia cuba melompat keluar dari buaiannya di rumahnya di Taman Sera, Padang Sera, Kodiang Isnin lalu.

Bayi itu, Lai Xiang Zheng, bertukar biru dan tidak sedarkan diri apabila ibunya yang berbangsa Thai, Narumon Pasupah, 33, menjenguknya pada jam 1.15 petang.

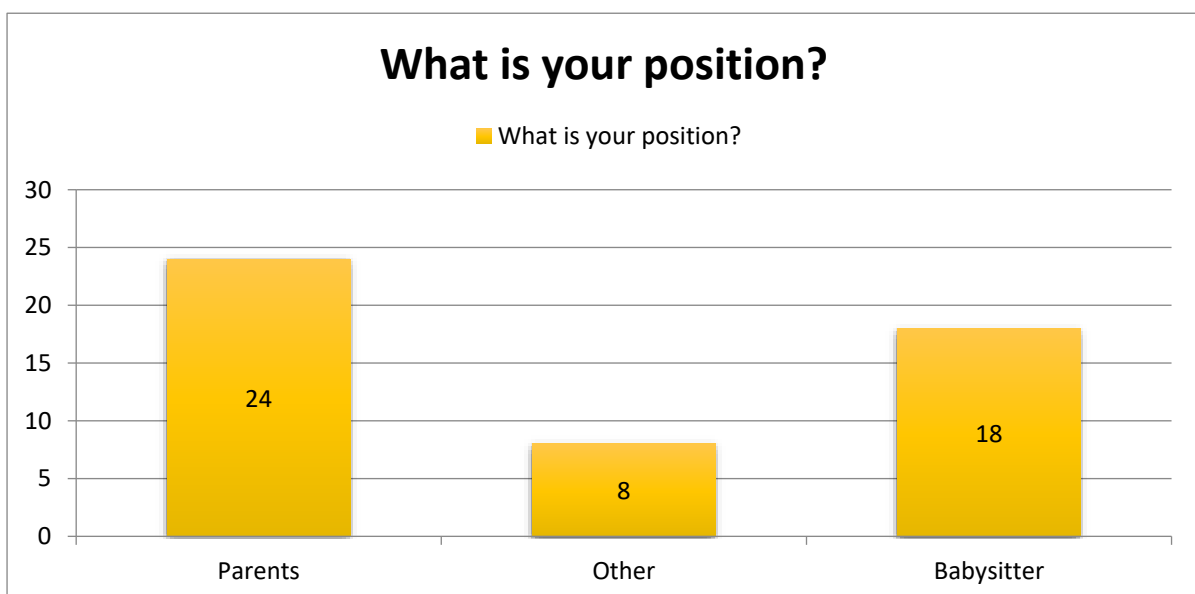
Ketua Supritendan polis Kubang Pasu, Abdul Hadi Hassaan, apabila dihubungi, berkata, bayi tersebut merupakan adik bongsu daripada empat orang adik beradik dijumpai tercekik oleh tali tersebut dengan kaki dan badan terkeluar dari buaian.

"Ibu mangsa telah keluar untuk menjemput anak sulungnya di sekolah berdekatan dan terkejut apabila menjumpai anaknya sudah tidak bernyawa setelah pulang.

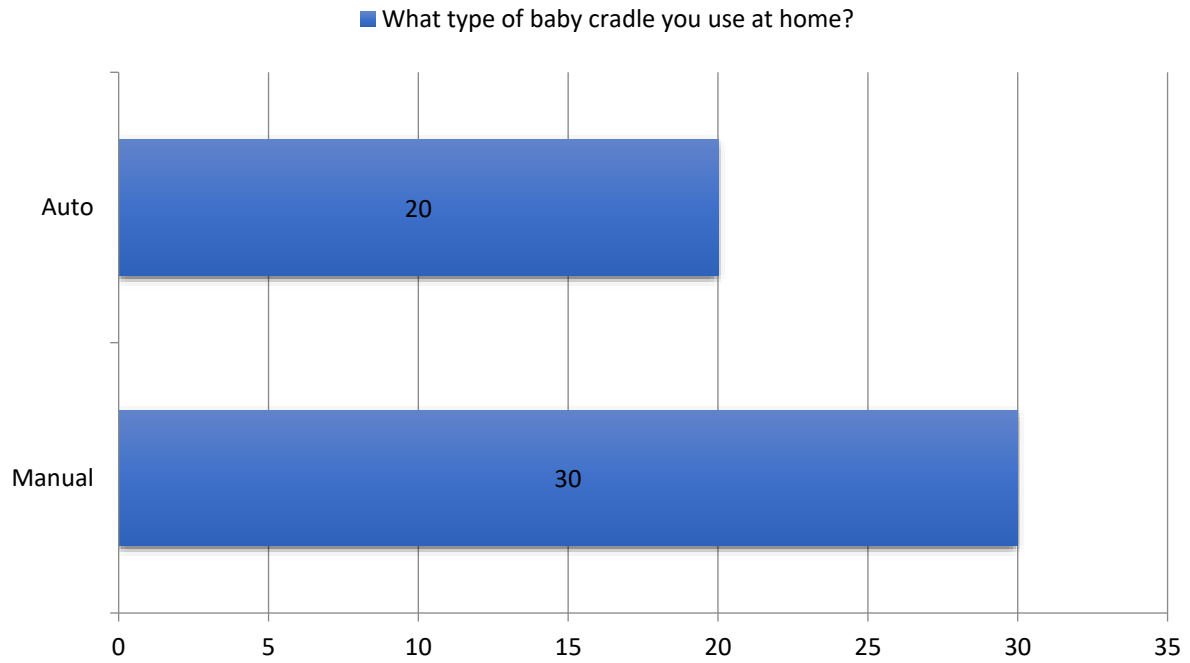
"Bayi itu telah dikejarkan ke Klinik Kesihatan Kodiang namun telah disahkan sudah meninggal dunia 20 minit sebelum itu," kata Abdul Hadi.

Sebelum ini kes ini dilaporkan bayi ini meninggal dunia akibat lemas selepas terjerut di buaiannya.

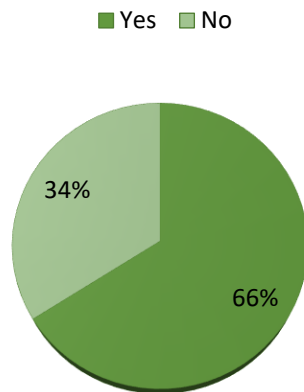
APPENDIX B



What type of baby cradle you use at home?

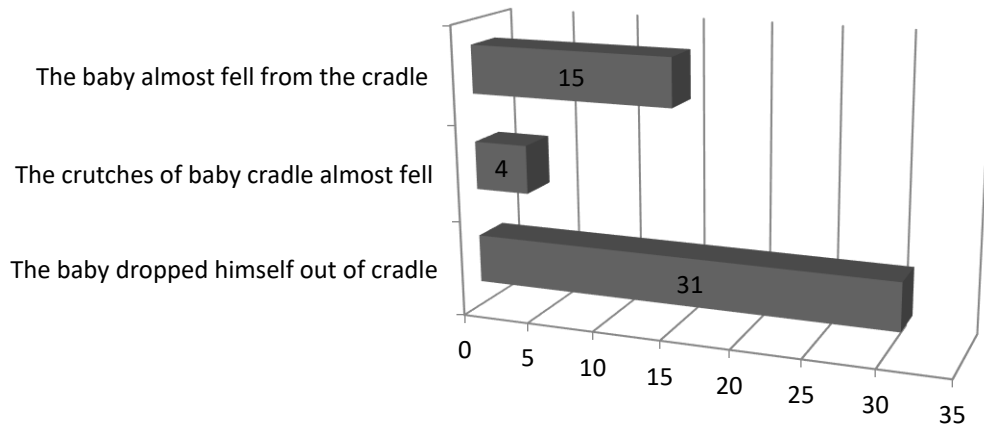


Have you ever seen or read in the news about the unsafetyness when using baby cradle spring?



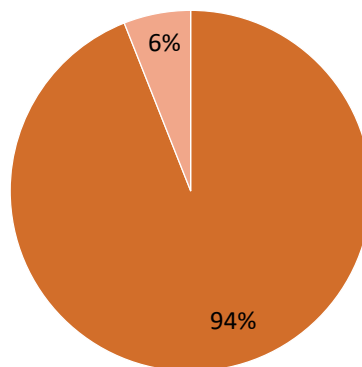
Have you ever experienced the situation below ? (Can choose more than one answer)

■ Have you ever experienced the situation below ? (Can choose more than one answer)



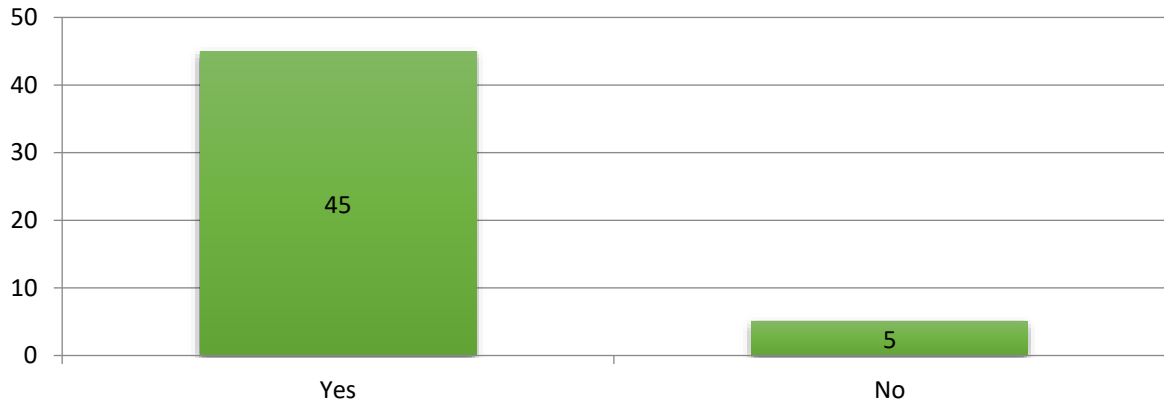
In you opinion,do you guys need any extra safety on the current baby cradle?

■ Yes ■ No



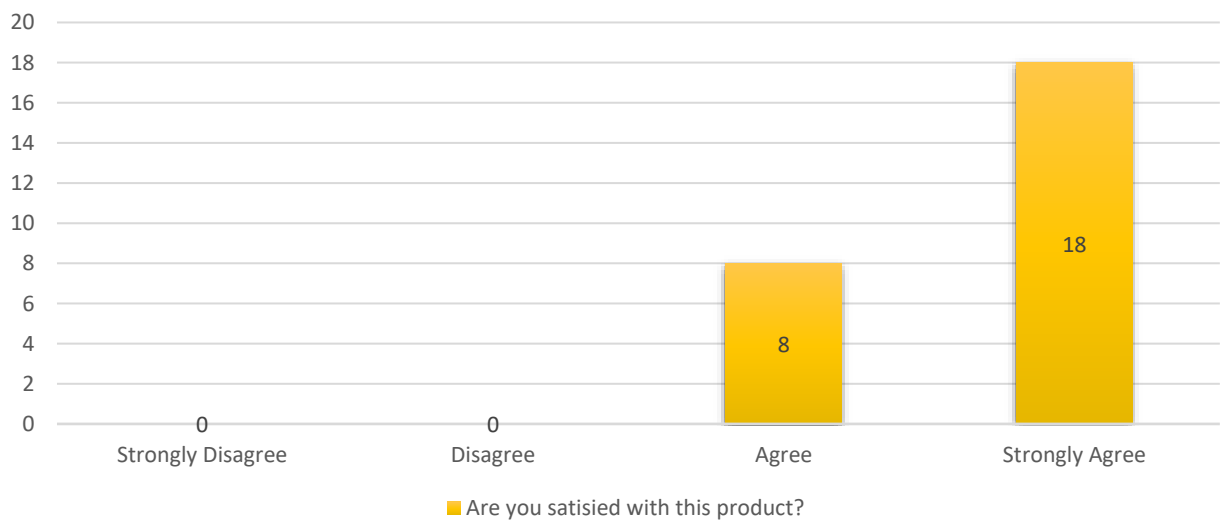
Do you agree with the project Safety Baby Cradle ?

■ What do you think about an additional safety features such as an auto-lock spring and send a signal? (You can give suggestion)

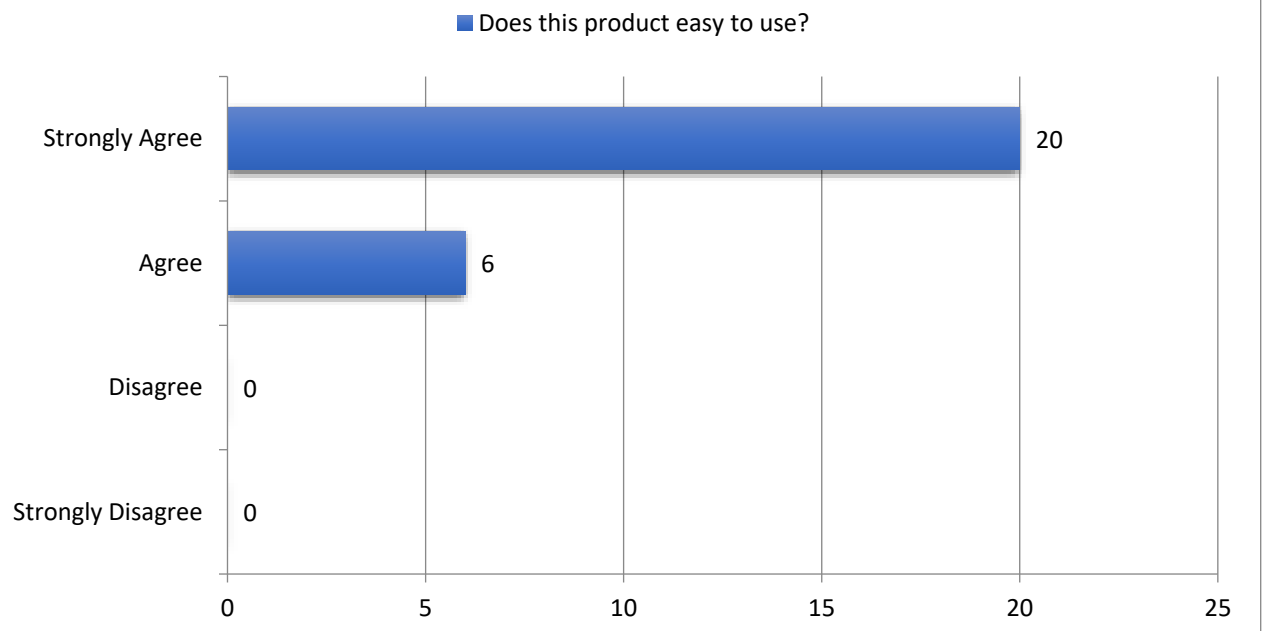


APPENDIX C

Are you satisfied with this product?

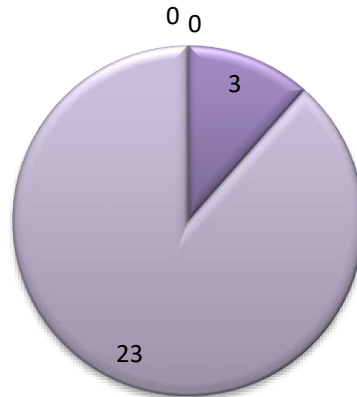


Does this product easy to use?



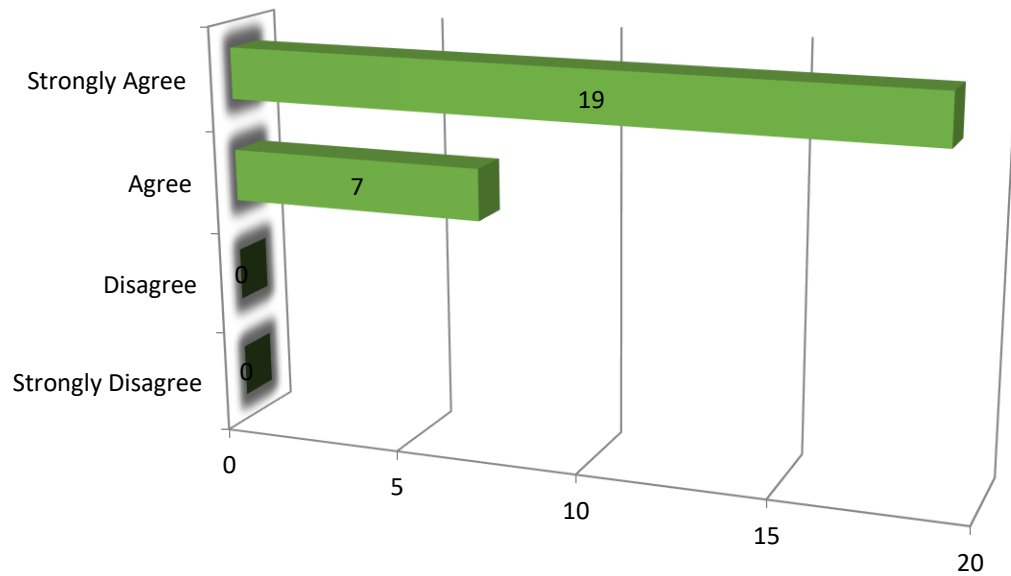
Does this product help to overcome your problem?

Strongly Disagree Disagree Agree Strongly Agree



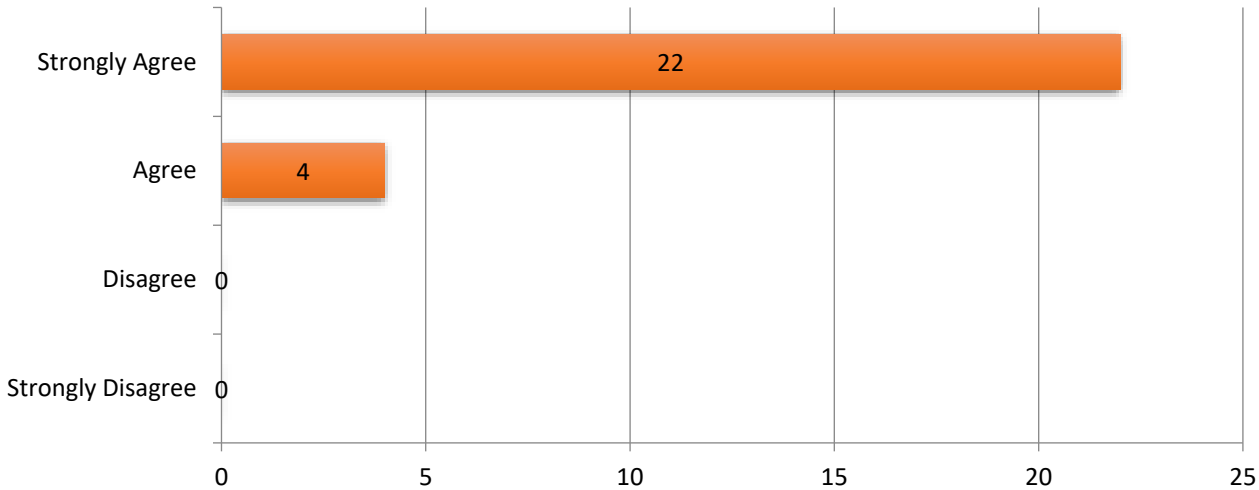
Does this product make your life more convenient?

Does this product make your life more convenient?



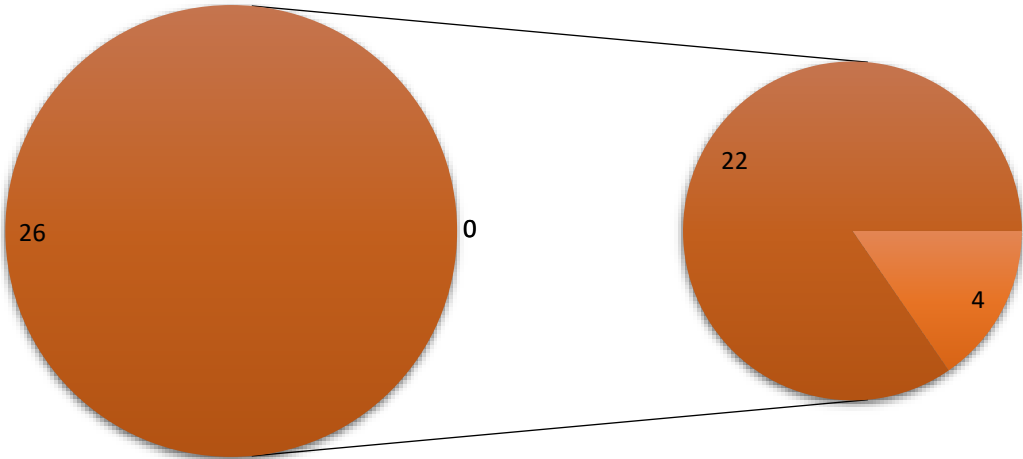
Do you agree that this product help you to make a quick action if any emergency happen?

Do you agree that this product help you to make a quick action if any emergency happen?

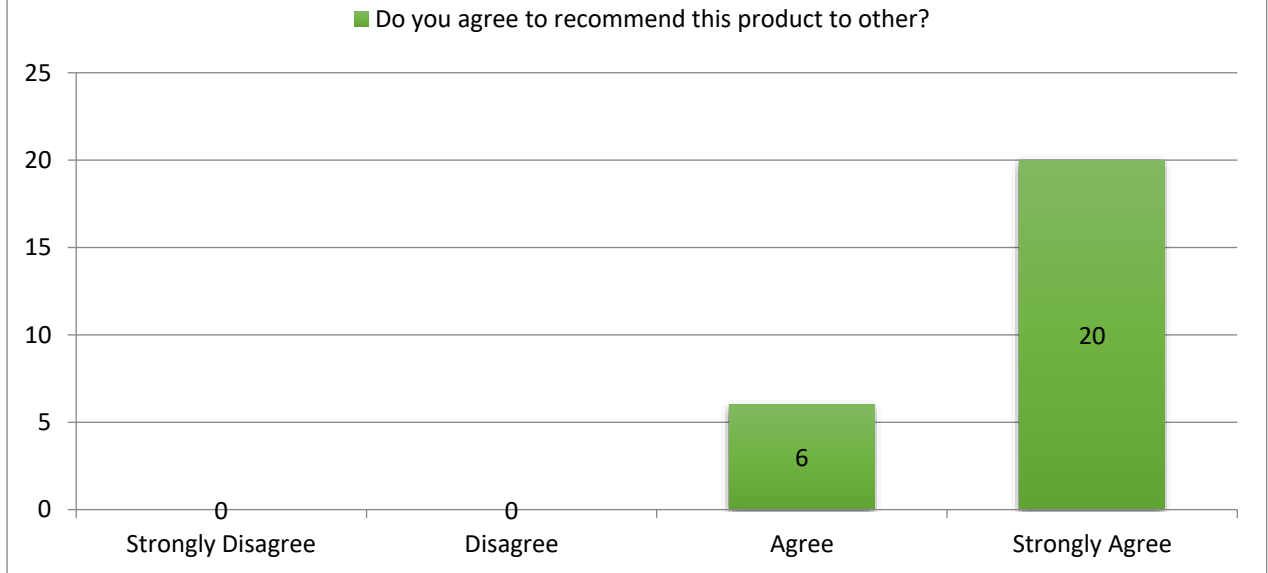


Does this product enhance the safety factor of baby while in the cradle?

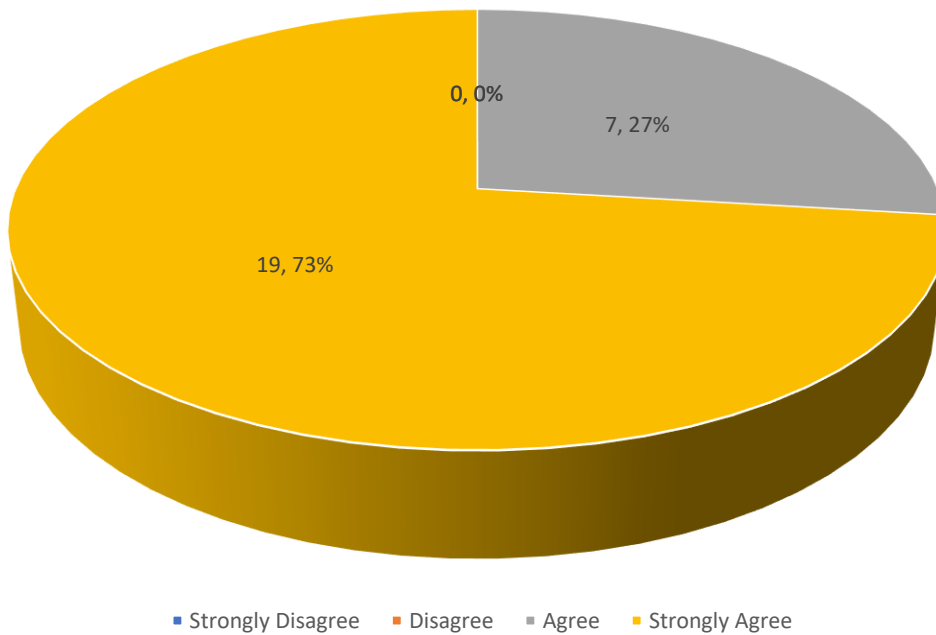
Strongly Disagree Disagree Agree Strongly Agree



Do you agree to recommend this product to other?



Are you agree this product should commercialize into market?



APPENDIX D

```
#include <LiquidCrystal.h>

#define M1a 10 //MOTOR1
#define M1b 11 //MOTOR1
#define LIMIT1 2
#define LIMIT2 3

LiquidCrystal lcd(8, 9, 4, 5, 6, 7);

//-----

int TIMER1x=0;
int TIMER2x=0;
int MOVEOUT=0;

float HUJAN=0;
float LDR=0;

float Sens1;
int Sens1Pin = 0;
float Sens2;
int Sens2Pin = 1;

void setup() {

  Serial.begin (9600);

  pinMode(M1a, OUTPUT);
  pinMode(M1b, OUTPUT);
```

```

pinMode(LIMIT1, INPUT);
pinMode(LIMIT2, INPUT);

lcd.begin(16, 2);
lcd.clear();
lcd.setCursor(0, 0);
lcd.print(" -- WELCOME --");
delay(2000);

lcd.clear();

}

void loop() {

//-----ADC conversion for sensor-----
Sens1 = analogRead(Sens1Pin);    //read the value from the sensor
Sens1 = (5.0 * Sens1 * 100.0)/1024.0; //convert the analog to digital for HUJAN
HUJAN = Sens1;

Sens2 = analogRead(Sens2Pin);    //read the value from the sensor
Sens2 = (5.0 * Sens2 * 100.0)/1024.0; //convert the analog to digital for HUJAN (MAIN SENSOR)
LDR = Sens2;

Serial.println(Sens1);
Serial.println(Sens2);

if (HUJAN <= 100 || LDR <=100){

```

```

    lcd.setCursor(2, 1);
    lcd.print("MOTOR IN ");
    Serial.print("MOTOR IN ");
    delay(150);
    while (digitalRead(LIMIT1)==1){
        digitalWrite(M1a,HIGH);
        digitalWrite(M1b,LOW);

    }
    digitalWrite(M1a,LOW);
    digitalWrite(M1b,LOW);

}

if (HUJAN >100&&LDR>100){

    // Serial.println(Sens2);      // prints the value of the sensor to the serial monitor
    delay(50);          // wait for this much ti
    lcd.setCursor(2, 1);
    lcd.print("MOTOR OUT ");
    Serial.print("MOTOR OUT ");
    delay(150);
    while (digitalRead(LIMIT2)==1){
        digitalWrite(M1a,LOW);
        digitalWrite(M1b,HIGH);

```

```
    }  
    digitalWrite(M1a,LOW);  
    digitalWrite(M1b,LOW);  
  
}  
  
}
```