



## **UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

### **DEVELOPMENT OF HOCKEY TRAINING KIT FOR HOCKEY TRAINING**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer System) with Honours.

By

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This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UteM) as a partial fulfilment of the requirements for the degree of Bachelor of Computer Engineering Technology (system computer) with Honours. The member of the supervisory is as follow:

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## ABSTRAK

Dalam projek ini bertujuan untuk meningkatkan prestasi pemain hoki dengan menggunakan mesin penolak bola hoki. Mesin ini perlu mempunyai reka bentuk optimum dan mempunyai ciri-ciri keselamatan yang baik untuk kegunaan semua. Tujuan projek ini dibina adalah untuk menggantikan pemain yang menolak bola di dalam latihan kerana kerap melakukan kesalahan. Ini kerana, mesin ini dapat mengurangkan masa yang terbuang dan dapat mengurangkan kesilapan yang sama ketika didalam latihan. Seterusnya, mesin ini dapat meningkatkan kemahiran penyerang untuk menjaringkan gol terutama apabila mendapat pukulan sudut penalty. Ini kerana, mesin ini mampu menghantar bola tepat kepada pemain. Analisis ini melibatkan kajian ketepatan dan tekanan menolak bola keluar daripada mesin bola hoki ini. Berdasarkan analisis yang telah dilakukan di Universiti Teknikal Malaysia, Melaka menunjukkan bahawa mesin ini diperlukan untuk membantu dan melatih para pemain untuk menahan dan menjaringkan gol melalui pukulan sudut venalty. Selain itu, bagi yang baru hendak bermain hoki juga boleh menggunakan mesin ini untuk berlatih menerima dan menahan bola. Oleh itu, mesin ini sangat bermanfaat dan banyak kelebihan kepada pemain untuk berlatih dan mempertingkatkan prestasi permainan.

## **ABSTRACT**

The aim of the project is to enhance the performance of hockey players by using hockey ball pushing machines. This machine should have optimum design and have good safety features for everyone to use. These days, no matter how amateur player until professional players always make a mistake during game especially in penalty corner situation. Therefore, it is important to design a machine hockey ball pusher that has a relatively higher efficiency. This project must develop hardware for replace the pusher in the training. It is because, this machine will reduce wasting time and reduce make same mistake in training. Next, this machine can improve the skill of stopper and flicker to make a score especially when giving the penalty corner. This because machine hockey ball pusher can send the ball exactly to the stopper. The analysis involves the study of accuracy and pressure of hitting the ball out of the machine. According to an analysis done at the Universiti Teknikal Malaysia, Melaka shows that this machine is needed to help and train players to hold back and score goals through a penalty corner. In addition, those new to hockey can also use this machine to practice receiving and holding the ball. Therefore, this machine is very useful and has many advantages for players to practice and improve the performance of the game.

## **DEDICATION**

I would love to dedicate this to my beloved parents, family and who have supported me through all ups and down journey and have been a wonderful source of motivation and inspiration for me in order to complete this project.

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# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

Field hockey is a team game of the hockey family. The game can be played on water turf, grass and artificial turf or it call synthetic field. Each team maximum can play with eleven players, including goalie keeper. To play hockey, players use sticks made of wood, carbon fiber, fiber glass or a combination of carbon fiber to hit, slap and push the ball. The ball can be played in several way with is, pushed, hit straight ahead or behind on the ground.

### 1.1 Background

Before field hockey was invented, people especially had winter in their country played that call Hockey Ice. When ice melts, they can no longer to play ice hockey. Base on that, they created games same as hockey ice that call field hockey.

Now a day hockey field is a fast and intense sport played worldwide by 1.6 million player that has register and many more are hobby to players in non-official leagues. To register this, that has about the FIH.

FIH means International Hockey Federation that is recognized by the international Olympic committee, as well as by the FIH's members and the continental Federations, as the sole ultimate governing body for the sport of Field Hockey throughout the world. This game can play by men's and women, adult and kids.

With the growth of the technology in machine, this machine hardware been created to make easier for hockey player during training session especially for the stopper, pusher and flicker in penalty corner. It is because, many players always make a mistake during in training or in the tournament.

Overall, this machine gives more advantages to the player to improve they skill and try to reduce the mistake especially time tournament.

## **1.2 Problem Statement**

These days, no matter how amateur player until professional players always make a mistake during game especially in penalty corner.

Next, went player(pusher) always make a mistake, it will be wasting time for the player(flicker) in the top D because do the same mistake.

## **1.3 Objective**

The main objectives of this research focus on the aspect listed below:

1. To develop hardware for replace the pusher in the training.
2. To improve the skill of stopper and flicker to make a score especially when giving the penalty corner.
3. To train players make a better in penalty corner.



## **1.4 Scope**

The scopes of this research work are to establish based on the objectives mentioned. It consists of hardware to build up this hockey training kit. For this project, the hardware used are galvanized steel, screw, aluminium composite, washer, angle bar, aluminium angle bar, power window motor, fishing cable, door hinges, prospect ang spring rod.

## **1.5 Conclusion**

In conclusion for this chapter, this project focuses on the development of hockey training kit for hockey training. Power window motor will be set the power to push the ball out to the stopper. The main objectives for this project are to develop hardware for help and training the player stopper and flicker. The reasons to develop this machine is to practice player stopper and flicker to make a goal and reduce mistake.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.0 Introduction

In this chapter will discuss on the literature review of the previous research that are related on this project. Literature review that be discussed later in this chapter is about field hockey such as, rule of hockey and size of field hockey.

#### 2.1 Size of field hockey pitch

Field hockey is playing surface for the game of field hockey. Normally the game played on natural grass, but for a couple of days it was played on an artificial turf (synthetic fibers). The International Hockey Federation makes this all the lines, markings and goal requirements. For example, in the case, if a ball on the side line is still in the playing area, a ball on the penalty circle line is in the penalty circle, a foul committed over the 23-meter line has occurred in the 23-meter area. The hockey pitch is in shape rectangular. The longer perimeter calls side line, that is called goal line between the opposing shorter back line and the portion between goalposts. The side line is 91,40 meters long and the back line is 55,00 meters long. Apart from that, white colour and 75 millimetres wide are required for all line marks. The field must be green, ultramarine blue, or signal blue on artificial turf surface. (spencer et al, 2004). Component in the standard hockey pitch:

- The size of the hockey pitch. The traditional hockey pitch is 100 yards long (91.4 m) and 55 m wide (60 yards).
- The goal. The hockey goal is 7ft tall (2.14m) by 12ft wide (3.66m).
- Penalty place. Such as in soccer, this is the point from which in a hockey game a penalty strike is taken. This is goalmouth 7 yards (6.4 m).
- A spectacular circle. The striking circle is a 16-yard 'D' shaped area from the goal post. To score, there must be an attacking player in this area. It is also referred to as the ' shooting circle, ' goal circle, ' or 'D. '.
- Back line. The back line is simply a line marking the lengthwise end of the hockey pitch. It is 60 yards long.
- Line halfway. This is simply the line dividing the field of hockey into two separate halves.
- The line of 25 yards. This is a line of 25 yards (22 m) from the goal found in each attacking portion of the pitch. Intentional infringements can result in a penalty corner being awarded in this area.

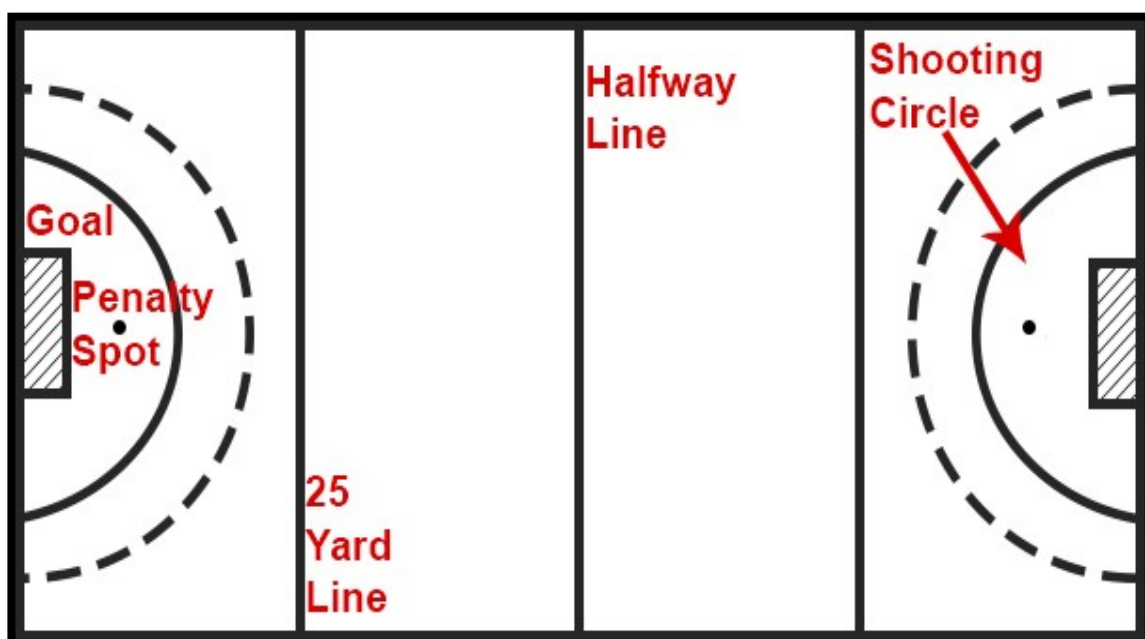


Figure 2.1: Standard pitch measurements ([www.realbuzz.com](http://www.realbuzz.com))



Figure 2.2: Standard pitch signal blue ([www.quora.com](http://www.quora.com))



Figure 2.3: Standard pitch green ([www.astroturf.com](http://www.astroturf.com))

## 2.2 Rule of field hockey

It consists of two and four halves of field hockey. Usually there will be 35 minutes each for two halves and 15 minutes each for four halves. There are basically 11 players and 6 replacement parts. There must be 10 players in the pitch and 1 must be a goalkeeper. Apart from that, field hockey can play aside 6's, 7's aside and 9's aside. Each player must have a hockey stick that they can use to hit the ball on one side of the stick. Hockey player (besides goal keeper) is one of the important things that is not allowed to use feet or any other part of the body to control the ball at any time. They only have to use stick hockey to push or hit the ball. Then again, either from a field goal, a penalty corner or a penalty stroke, a goal can only be scored. A field goal is a goal scored out of open play and can only score in front of the opponent's goal from within the 'striking circle'. It doesn't count as a goal if the Stricker hits outside the circle and goes into the goal. Most scoring opportunities come from penalty corners in each match. n hockey with umpires. Two umpire's office the match on the field and another umpire may sit at the table of the scorer. The ball that must be passed or dribbled down the field with the flat side of the stick and a goal is scored when the attacker hits the goal in the striking circle. Perhaps the important thing for players is not using body or stick to shield the ball. (Wimshurst ZL et al, 2015). Rules in the game:

- Two halves in college and international play, 35 minutes each, 30 minutes in high school play.
- Four halves, 15 minutes each in international play.
- 11 Players on each side, including the goalie.
- The match is formed by two umpires on the field. Another umpire can sit at the table of the scorer.
- When an attacker strikes the ball inside the striking circle, a goal is scored.

- Players are not allowed to use their body or stick to shield the ball. All players must have equal opportunities to play the ball.

## 2.3 Equipment of field hockey

### 2.3.1 Stick

The important part of playing hockey is stick. There are two stick types with composite and fiberglass and wood. Wood sticks, it is traditionally made of hickory or mulberry, that are mostly used by youth players for their lightweight feel and flexibility. Other things are composite and fiberglass sticks are legal for college and international play. (P. Tadapatri et al, 2010). Requirements hockey stick:

- On the playing side, the stick had to be flat (the left side when the stick head toe faces away from the user)
- It had to pass through a two-inch (internal diameter) ring completely.
- The stick's head was to be a) curved and b) wood-based.



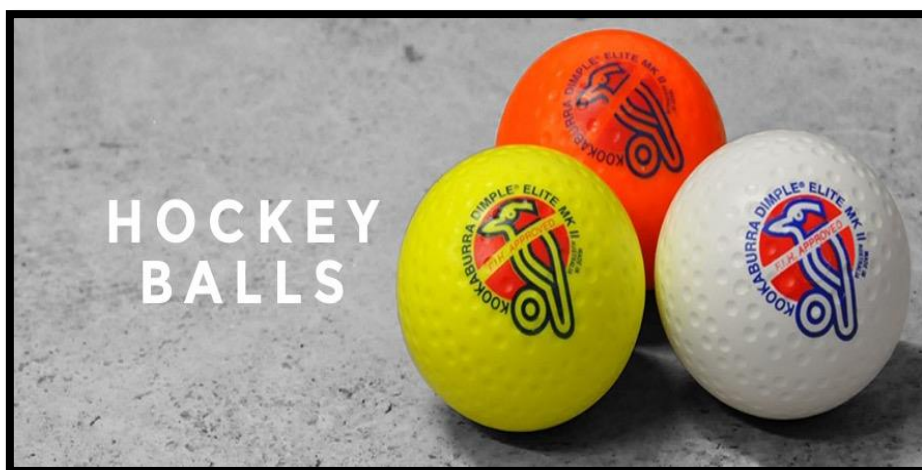
**Figure 2.4: Wood stick (www.kookaburra.biz)**



**Figure 2.5: Composite and fiberglass stick ([www.amazon.com/Grays](http://www.amazon.com/Grays))**

### **2.3.2 Ball and Goals**

There is also a need for a field hockey ball. Wanting to start the game or start training is important. Usually this ball is white and made of a solid, hard plastic. It must weigh between 5 1/4 grams and 5 3/4 grams, and it must measure the circumference from 8 13/16 inches to 9 1/4 inches. Apart from that, field hockey needs two goal cages, one at each end of the field. These measure a width of 12 feet, 7 feet high and 4 feet deep. (David V. Thiel et al, 2012)



**Figure 2.6: Field hockey ball ([www.ahockeyworld](http://www.ahockeyworld))**



**Figure 2.7: Field hockey goal ([www.sportsfieldspecialties.com](http://www.sportsfieldspecialties.com))**

### **2.3.3 Shoes and Protective Gear**

A shoe is one of the important things to play field hockey. In field hockey, shoes need to get a good grip on the field. Apart from that, shin guards are important because they protect the legs against ball or opponent sticking.



**Figure 2.8: Field hockey shoes ([www.justhockey.com.au](http://www.justhockey.com.au))**