

# 參賽隊伍人員及機器人簡介

## Team Member and Robot Introduction

組 別：遙控組 自動組 指導老師：蔡清發 Tasy Ching-Fa  
學校名稱：明志科技大學 隊伍名：MCUT 救難隊  
(School : ) Mingchi University of Technology (Team name : ) MCUT GUARDER

### 壹、參賽隊伍人員(Contestants)

一、指導老師：蔡清發(Tasy Ching-Fa)

二、組員：歐忠翰(Ou-Jhong-Han)、金桓屹(Jin-Huan-Yi)、  
林大衛(Lin-Da-Wei)

### 壹、貳、機器人簡介 (Robot Introductions)

#### 一、構想與策略分析(Idea And Tactics Analysis)

MCUT 救難隊-機器人，構思是以人行走的腳部的抬起、踏下的動作移動及跨越障礙物為整體機器人移行動作。運用夾鉗動作、邊走邊夾與繩索吊掛的組合為類手部動作，將吉祥物寶寶自地面拿起並放置於吊籃中。再以省力速升(降)機構將吊籃吊掛於滑桿上，順利將吉祥物寶寶滑送到特定點。

MCUT GUARDER is a robot's name. We use human's walking step to cross the obstacle. We use a claw and a roll to be a hand. The hand catches the doll and put into a basket. And then using a mechanism to remove others places.

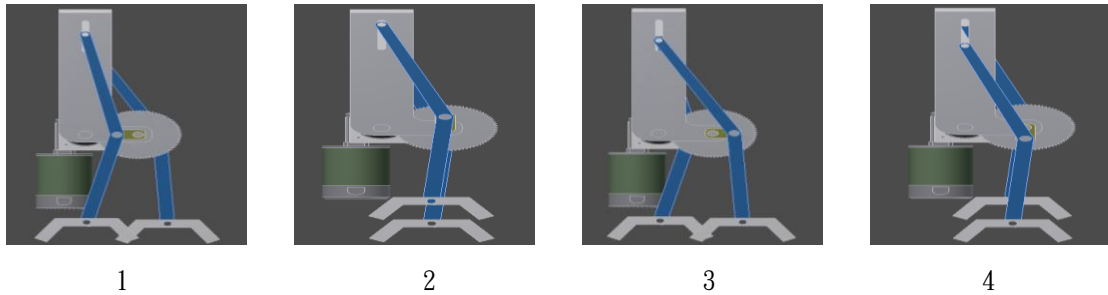
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### 二、機構設計(Mechanism Design)

(1) 機器人(移動)腳部動作為曲柄(輪)、滑槽(塊)機構模式

如圖 1~4 所示。馬達傳輸動力使曲輪(齒輪)順時轉動



※連續動作即為由①~②~③~④~①一直循環※

We use cranks and others mechanisms to present the robot movement. For figure 1~4. Rely on the motor and power, the gear can clockwise rotation.

#The movement is 1~2~3~4~1 to circulation

(1) 機器人手部(夾娃娃)動作(如照片)，以馬達直驅螺栓使活動臂作擴開與縮夾動作，達成夾娃娃的動作。配合機器人移動，可一次夾 3 個娃娃。

The robot's hand action, for figures. In order to catch a doll, we control the robot arm and analyze the action by the motor. The robot duty of movement will catch three dolls in a time.

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(3)舉升動作設計以省力化速(倍)升機構，運用馬達直結螺紋桿正反轉(左旋、右旋)，達成設計最低高度與最高揚程的需求。

The raising mechanism used the motor to control directions. And get a highest or lowest length.



最低高度

馬達直結螺桿

最高揚程狀態

### 三、輪子驅動設計(Tire Driver Design)

前腳：馬達直結傘形齒輪組，帶動曲柄(輪)、滑槽(塊)機構，使腳(左桿、右桿)作交替踏出、抬起動作，達成前進步伐要求。並設計轉向機構於前進(後退)中職接轉彎。

後腳：為雙後腳設計，以一個強力減速雙軸端馬達，經時規齒輪與皮帶組分別帶動左、右後腳曲柄(輪)、滑槽(塊)機構，使兩後

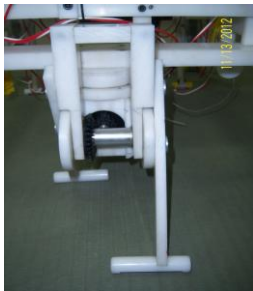
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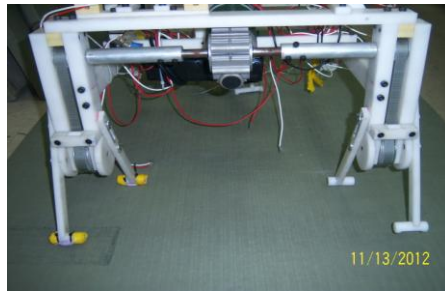
腳(左桿、右桿)同步作交替踏出、抬起動作，達成前進步伐要求。

Forefoot: The motor has gears and cranks let the foot do any actions. And achieve our request. We designed a mechanism which can change directions.

Back foot: It's a double feet design. The deceleration biaxial motor, gears, ties and cranks let he feet do any actions. And achieve our request.



前 腳



雙 後 腳



右後腳

### 四、電路設計(Circuit Design)

以最基本線路接線、配合按鈕式切換開關，方便操控人員作點放、連續型式操作。

We use a simple method to control the robot. Like the simple circuit design and switch. It makes operators control the robot easily.

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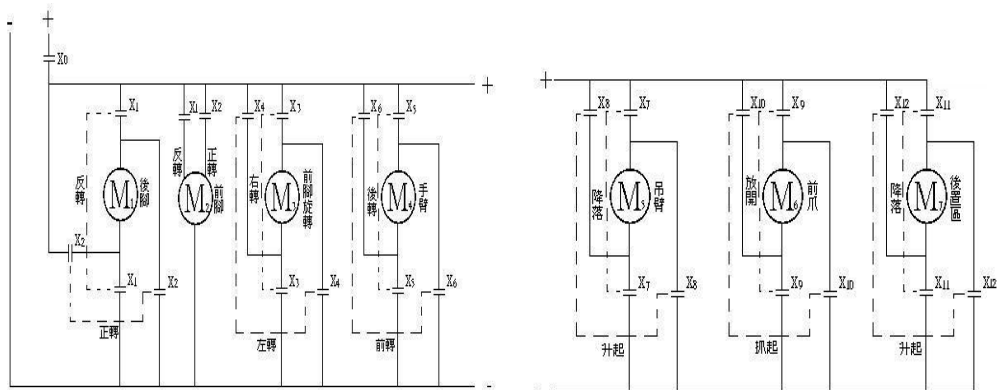


正面

背面

側面

上面



線路設計圖

### 五、組裝、測試與修改(assemble )

機器人初期設計、製作採四腳式，兩腳兩腳連鎖，以鏈條、鏈輪傳動。機構零件採鋁合金材料為主，經各式加工、組裝、運轉等，發現整體過重，而決定重新改『工程塑料 POM』為主體材料。各機件、機構組裝如下：



夾爪

曲(柄)輪

後腳

前腳(正)

前腳(轉向)

馬達座

升降機構

整體

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In originally, the robot has four feet. We use chains and sprocket wheels to control the feet two by two. The components were composed of aluminum. But after we made the robot, it is too weighty to join the contest. So we decided using POM to be the material. For figures,

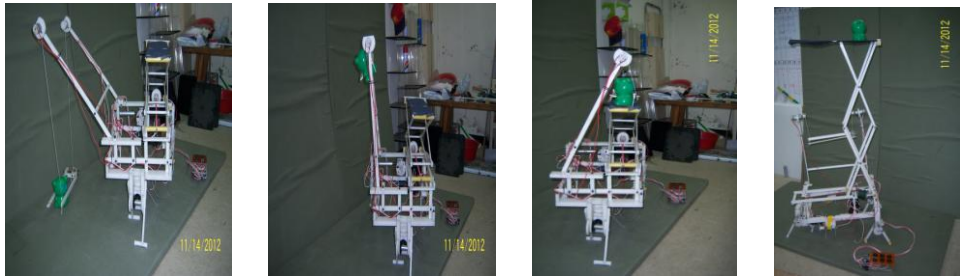
### 六、機器人創意特色說明(The Robot originality)

MCUT 救難機器人設計特點就是簡捷、動作單純，以單足式設計，踏提間可直接跨越-障礙區的倒木(5cm 高 6cm 寬)。如圖)移行時由前腳直接轉向前進。如圖。夾爪設計可配合移行之中夾持娃娃(3 隻順序一次夾取)。最主要 MCUT 救難機器人特色是『全身潔淨(白)』，因為 MCUT 救難機器人皆以『POM』工程塑膠(鋼)加工製作組合。

MCUT GUARDER is a robot which has a fast movement and single foot design. It can cross the fallen trees(5X6) in a area. For figure, the robot changes directions by foot. For figure. The claw duty of movement will catch three dolls in a time. MCUT GUARDER has a white color is a principal cause because it composed of POM to manufacture.

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### 參、參賽心得 (The Reflection On Robot)

第十六屆 TDK 全國大學院校創思設計與製作競賽主題是『機器人救災大作戰---高空救援』。機器人移行限定仿『人』行腳部的動作，腳與腳需間斷式踏行前進，不可以應用類滾動方式。由於從未有依一主題『從零到有』的設計與製作經驗，只參考學長約 5 年前作品-輪行式機器人。整個歷程非常有挑戰性，經指導老師與參與同學們的努力。今年終於有如期參加比賽盛會，也由比賽中觀摩其他學校隊伍，獲取許多經驗與專業知識。

TDK 全國大學院校創思設計與製作競賽活動，由一主題讓參加者從構思、設計、機械元件選用、材料應用、應用各種機械自己動手加工、組合、測試至修改功能性等等歷程。是很紮實又有專業性的活動，對科技性大學實務性學習啟發很大。我們將鼓勵學弟、妹們參與此有意義的實作性專業競賽。

It is a 16th national university creative design. And the topic is 機器人救災大作戰之高空救援. The robot's action

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must like human's footsteps. Can not scroll. We learned how to design and make the robot. So we referenced senior's robot and researched it. It was very challenge. Because of teacher's encouragement and our efforts, we have the honor to participate in the competition this year. We got a lot of experience by competition.

TDK is a national university creative design that is a very meaningful competition. I learned a lot of knowledge. Likes design the mechanism, think over the mechanism and manufacture. It's a very professional activity. We will encourage everyone to participate in meaningful activities.