

ARTIKEL LEPAS
PENELITIAN HIBAH BERSAING



**Pengembangan Alat *Side Step Test Modification* Berbasis *Digital Tech*
Tahun ke 1 dari rencana 2 Tahun**

Faidillah Kurniawan, S.Pd.Kor, M.Or / NIDN. 0010108203
Dr. Siswantoyo, M.Kes / NIDN. 0010037203

UNIVERSITAS NEGERI YOGYAKARTA
FAKULTAS ILMU KEOLAHRAGAAN

November Tahun 2013

Dibiayai oleh:
Direktorat Penelitian dan Pengabdian Kepada Masyarakat
Direktorat Jenderal Pendidikan Tinggi
Kementerian Pendidikan dan Kebudayaan
Sesuai dengan Surat Perjanjian Pelaksanaan Penugasan Penelitian Hibah Bersaing
Nomor 001/APHB-BOPTN/UN34.21//2013

INNOVATION SIDE STEP AGILITY TEST BASED ON DIGITAL TECHNOLOGY

Faidillah Kurniawan¹, Siswantoyo^{1,2}, Herlambang Sigit P³

¹Sport Science Faculty, Yogyakarta State University, Indonesia

²Visiting Senior Lecturer, Sport Centre University Malaya, Malaysia

³Engineering Faculty, Yogyakarta State University, Indonesia

Abstract

Methods: Side step test is done by stepping aside right and left with a distance of 2.4 meters is done as fast as possible for 20 seconds . This research included in the multi-years research and development for 3 years .

Results: The first -year results of the study showed that the innovation side step test tool uses infrared sensors and a microcontroller system that uses battery energy . The tool set is packaged simple and easy to carry anywhere . Advantages result of this innovation include packaged in one kit , portable , energy saver battery , can store large amounts of data , can be downloaded directly to your laptop.

Conclusion: Conclusion of this study was composed of an innovative tool that can be used to measure agility, easy to do, effective and efficient.

Key words : development , tools , agility , digital

I. Introduction

This research is in order to realize the idea according to the market demands of a real product , which is then carefully to get a clear specification variations and has the distinction of which is a competitive advantage , which is the next stage of the tools that have been studied , can be patented in the name of college high and in production to serve the needs of the market . This study is also a form of follow-up realization and development of science and technology modifications Competitive Grant Program Decentralization UNY.

At each appearance of sport skills required quality biomotor good component capabilities , which include strength , speed , force (power) , endurance , flexibility , agility , balance and coordination (Iskandar and Kosasih , 1999: 3) . To be able to know how well the biomotor components , necessary instruments or measuring devices are qualified to be used in test and measurement exercise (sports measurement and evaluation). Here the team will examine the development of modified instrument to

measure agility test , which has been in the test instrument known by the term side step test.

In simple terms how to test the ability of the technical agility to side step test is underlined Testi standing middle , 120 cm on the Secondly jump right / left jump back 120 cm to center then jump to the other side , then back to the center . This is one complete cycle . Test subjects for a minute and then recorded how many have to do lap right and left (Widiastuti , 2011: 78) .

Technically and its implementation method is needed supplies tend to be very different from the gauge / instrument that had been used , but here the problem is on the device which has been widely used , test still tend to be manual and on the development side step test modification tool based the tech digital equipment will be designed based digital agility test , where the latter at the time of the test , it will automatically record the movement of the testi will be automatically records what score is in the can by testy.

The test instrument is very in craved by athletes who did after getting the right exercise program so he/she biomotor ability to increase significantly the measurement capabilities that biomotor reallies can be much more precisely with pre-existing conditions such as the data already in the can . Thus, in this case , the central and local KONI , Faculty of Sport and center - sports training center in Indonesia , because the instrument is needed in Indonesia, thus the presence of such instruments in the measurement process capability biomotor expected to be steady and standard can be more clear and precise and is more accurately measured in accordance with the requirements of the biomotor capabilities.

As a form of development or modification of existing tools mentioned above , it is considered to be the need to make development and customization tools Side step test modification based digital tech and tools can also register its intellectual property so that adds richness of Indonesian products . Another impact will provide opportunities in the domestic industry to innovate design measuring instruments biomotor other components , and formed a partnership with universities in developing the sports industry.

Special Purpose

Specifically this study aims: first, to realize / gauges modification provides development capabilities specifically biomotor agility to the test and evaluation capability

biomotor measurement, and the second is to obtain intellectual property rights. The process of goal achievement is done through the following steps:

1. Development of test and measurement instruments by modifying the tool of examples of tools that already exist today than merely a manual to digital technology-based tools.
2. Conduct laboratory testing techniques to the tools in terms of function, service, sustainability, performance and appearance.
3. Evaluating such tools.
4. Refine the tool.
5. Disseminating these tools to KONI and center - sports training center.
6. Market test / test user / field testing.
7. Based tools enhance the input - input and demands a candidate - a candidate instrument users.
8. Participate in developing the sports industry in Indonesia.
9. HAKI obtain the tool that was developed / modified.

Primacy Research

For DEPDIKNAS , the results of this research work is an achievement that can be patented , produced and marketed. For KONI or center - sports training centers in all corners of Indonesia , the results of this research is the development of measurement tools that have the ability biomotor modified too and remains easy to use , maintain , prices and equipment maintenance costs are relatively affordable to raise the quality of the athletes.

For universities , this study is the work of innovation and creativity in modifying existing tools with more capabilities renewable tool that can be developed at the same time proud and will bring up the relevant universities , and most importantly, is also an encouragement and stimulus for further work for the Faculty of sport Sciences in the field of engineering tools and sports industry development . And more than that , this work is an example that can encourage program - courses in universities to create a cooperation network traffic used in the manufacturing field.

For industry , an industry collaboration and new opportunities in the field of Higher Education and the Sports Industry at once an opportunity and a challenge for the industry to create and innovate further on tools - tools for realizing other supporting facilities sports equipment , modification or adoption of the system.

For students , involvement in the design , manufacture , testing , sale , and acquisition of intellectual property rights (HAKI) is the pride and real experience in working independently or in cooperation .

Targeted Results

1. Side step test development tool based modification of digital tech tools that are only manually / conventionally been developed in order to meet the needs of the domestic market and the needs of today's athletes which has a lot of athletes are capable of more than most out of existing measurement tools, other than that this tool tested its performance with potential users and will be enhanced according to the input - input from the user. Not only the performance test, to complement the reliability of this tool will be tested functions, test services, test and continuity test.
2. Patent (HAKI) test side step modification tool based on digital tech.

II. LITERATURE REVIEW

Modification of development tools side step test modification based digital tech is designed using principal components consisting of a spiral spring, and potentiometers, sensors, computers, ADC, microcontroller, and programs. Advantage of this tool is able to measure agility digitally. This development tool is a modification of the existing test instrument with the excess can be directly digitally can automatically display the results of the test scores the old instrument to meet the needs of sport gauges that are economically profitable when manufactured, consideration of the user is purchasing power, benefits, reliability, easy to use. Consideration of the designer and maker is sophistication, ease of finding parts, ease of production.

Agility

Agility (Agility): The ability of a person to move in any direction with ease (Andi Suntonda.S, 2009: 55). In line with that expressed by Widiastuti (2011: 125) who also explained that agility (agility) is the ability to change the direction or position of the body quickly carried along - together with other movements.

Designing

Type of product design according to Krutz (2000: 5) classified:

1. Original, which is the discovery that the design is completely based on the discovery never before.

2. Developer (modification), which is development of existing products in order to increase efficiency, effectiveness, performance, or the competitiveness to meet the demands of the market or the times.

According Espisito and Thower (2001: 6) need to answer the following questions:

- a. Is the product is appropriate human needs (market needs)?
- b. Is the product able to compete with its rivals?
- c. Is the product easy to maintain?
- d. Is economical to produce products or profitable?

Furthermore, Beam (1999: 30) says that the product is designed to be considered in terms of users, makers and designers. Consideration of the user side is the appearance, speed, ease of use, size, weight, benefits, reliability, ease of use, ease maintained, not expensive operating costs, purchase price, safety, comfort, and ergonomics. Consideration of the designers and makers are manufacturing cost, selling price, ease of test, age, availability of spare parts, recency, designed ease, competitiveness, easily made, simplicity, market demands, and storage and disposal. One kind of design is the development of existing products, where it is necessary to realize the modification (Hurst. K, 2006: 30). Modified objectives include:

- a. The demands of the market / demands of the times.
- b. Progress / development of science and technology.
- c. Need excellence product (market competition competitiveness)
- d. The need to adapt to the viewing capabilities tools / equipment / machinery / resources / materials manufacturing process is held to existing components.
- e. Any desire to be made cheaper
- f. In order for the product in question can be used again
- g. Lack of spare parts
- h. So that maintenance is easier and cheaper

Further, the modification should make a difference, which is a change from the old tool. Ma'asud and Mahmud (2004: 35) modification is to give different look with pre-existing items.

Differences can be developed that meets the following requirements: important, obviously, superior, communicative, precede, affordable and profitable, meaning that the average difference between providing enough benefits to customers the difference was not / no have the others, the difference was much better than the way who have same benefits, the differences can be understood by the user / buyer, the difference is not easy to imitate

competitors, buyers can take with price difference, and the difference was financially beneficial and rare intact designed by Gupta and Muthy (TTH: 27).

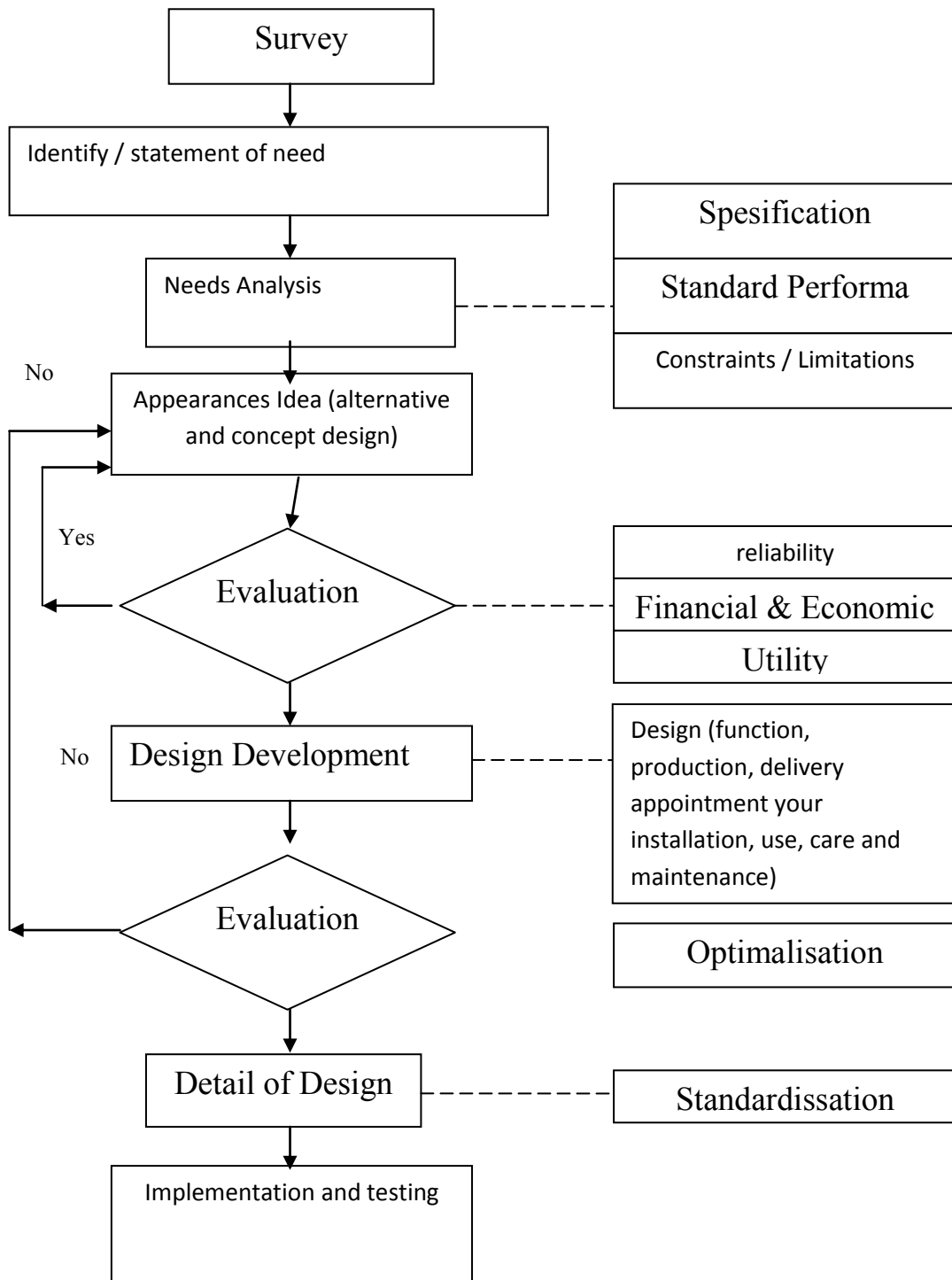


Fig.1. Step Design

Research Roadmap

Table 1. Research Roadmap

Related research has been done	Research to be conducted	Continued research will come	Finalization of last study
<p>* The data showed that the ability of the test instrument side step that has been used to manually / conventionally tally test scores tend to be vulnerable due to the implementation of a rapid test that can make testor less precise in the calculation due to the concentration of the observations and the many testi so as to reduce the concentration testor when calculating score results of the implementation.</p>	<p>Assembly / formulation development of modified side step test modification based on a prototype digital tech.</p>	<p>1. Testing tool development side step test modification based modification of digital tech to potential users and stakeholders concerned 2. Scientific publications both nationally and internationally</p>	<p>Modification of development tools side step test modification based digital tech has been tested and can be proposed for HAKI</p>

III. Research Method

This study is a research and development. The research design used by Borg and Gall approach. Method of research and development is a research method that is used to produce a particular product, and test the effectiveness of the product (Sugiyono, 2011 : 297). Research and development is a kind of product-oriented research. The resulting product is a development of an innovative tool for measuring agility ability.

Borg and Gall, 1983, (in Nana Syaodih Sukmadinata, 2006: 163) stated that development research procedure basically consist of two main objectives, namely: (1) develop the product, and (2) To test tthe effectiveness of the product in achieving the goals. The first objective function is called development, while the second is referred to as validation purposes. Thus the concept of the development of more precise research is defined as development efforts are accompanied by efforts to validate.

Flow chart of Research

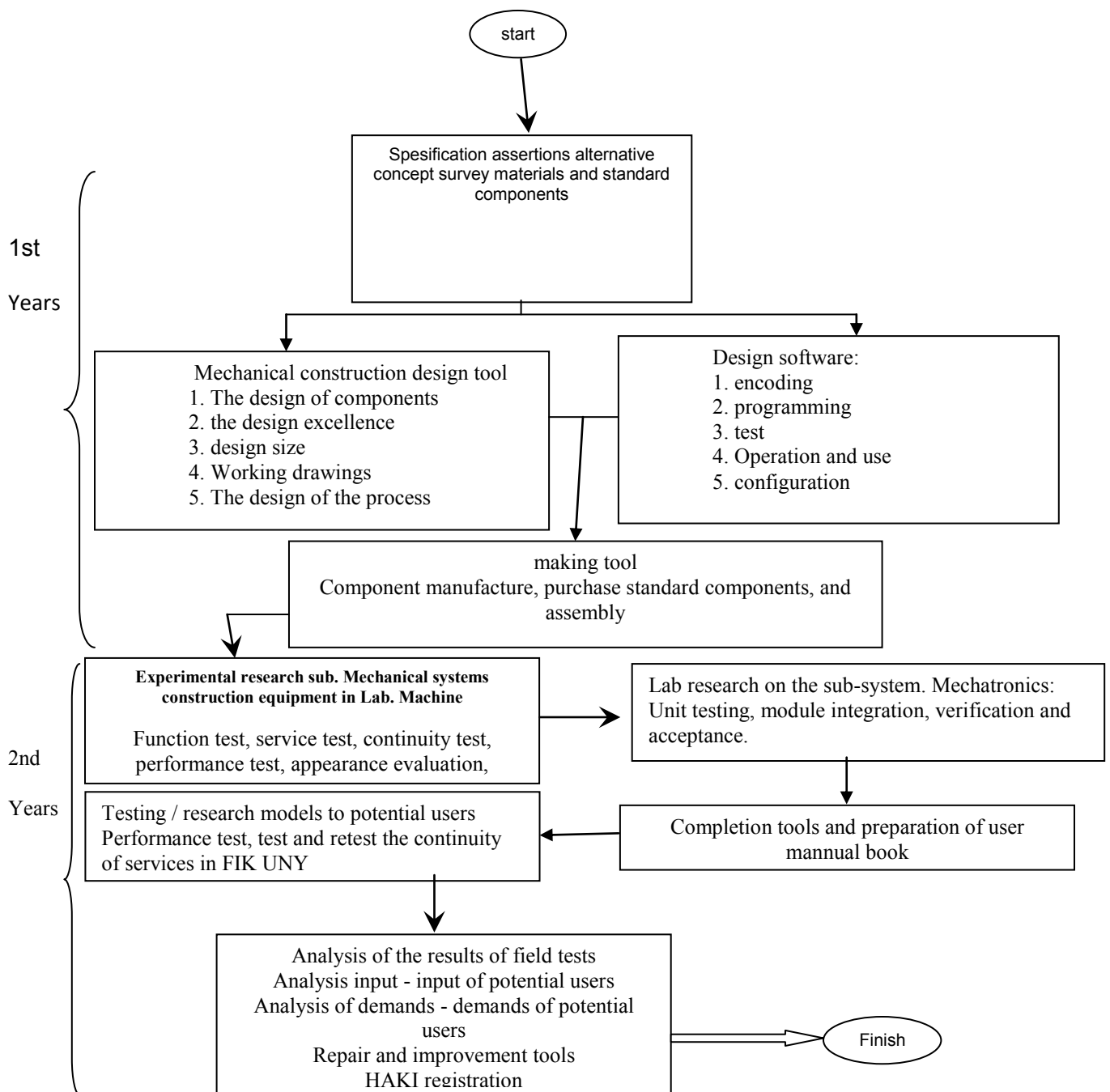


Fig. 2. Flowchart of research

Table. 2. lines of research

	1st Years	2nd years
	<p>1. Assertion specification, an alternative - an alternative concept, survey materials and standard components, the affirmation of the concept</p> <p>2. mechanical construction design tool included; designing components, design excellence, designing the size, working drawings, designing the process</p> <p>3. Making tools include; component manufacture, purchase standard components, and assembly.</p>	<p>1. Experimental research sub. Mechanical systems construction equipment in Lab. Engine covers; function test, service test, continuity test, performance test, appearance evaluation, and analysis of the price</p> <p>2. Completion tools and preparation of user</p> <p>3. Testing / research models to potential users in a way; performance test, test and test the continuity of services in FIK UNY.</p> <p>4. Analysis of the results of field tests Analysis input - input of potential users Analysis of demands - demands of potential users Repair and improvement tools HAKI registration</p> <p>5. Product ready for the market</p>
superficial	<p>Has been the creation of the product development side step test modification based modification tech digital ready prototype tested to be ability</p>	<p>1. Testing the product development side step test modification based modification of digital tech with competent sample elements as well as the associated potential users</p> <p>2. Publication of national and international scientific journals</p> <p>3. Evaluating shortcomings - lack of product development side step modification of digital tech-based test modification for improving the tool that really - really feasible and can be received in the future and feasible for users patented his work to get the HAKI</p>
indicators of Achievement	<p>Successfully assembled product development side step test modification based modification of digital tech</p>	<p>1. Testing showed the product development side step test modification based modification of digital tech with competent sample elements as well as the associated potential users to be able to be followed up in order to improve product</p> <p>2. Successful development of modifications to side step test modification based tech digital eligible to be marketed and used by stakeholders as users and also deserve to get the recognition of intellectual property rights.</p>

Finding Research

The following is picture of the mechanics of action of tools developed to measure agility.

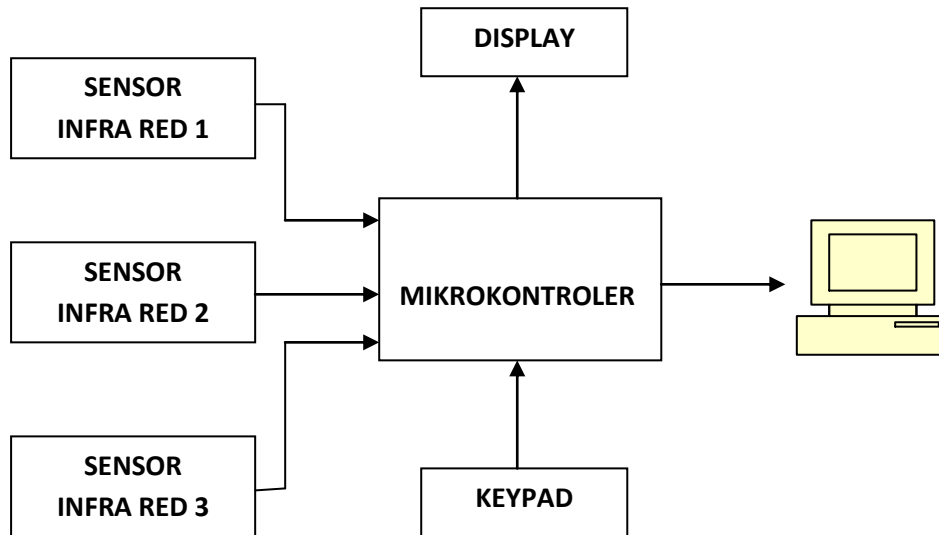


Fig. 3. Block Diagram

Component Specification :

- **Infra Red Sensor** : Tranciever-reicever
- **Mikrokontroler** : ATmega16
- **Keypad** : Matrik 3x3
- **Display** : LCD 4x32

Description agility tool:

Infra red sensor works by emitting light tranciever part to be received by the receiver section. If the light blocked by the foot of man it will impart information to the micro controller. Microcontroller will process the information from the sensor by adding up-counter, and will be repeated until the deadline finishes. Amount of time and a matter of feet past the sensor displayed on display. Keypad used to provide input data is number participants to the microcontroller.

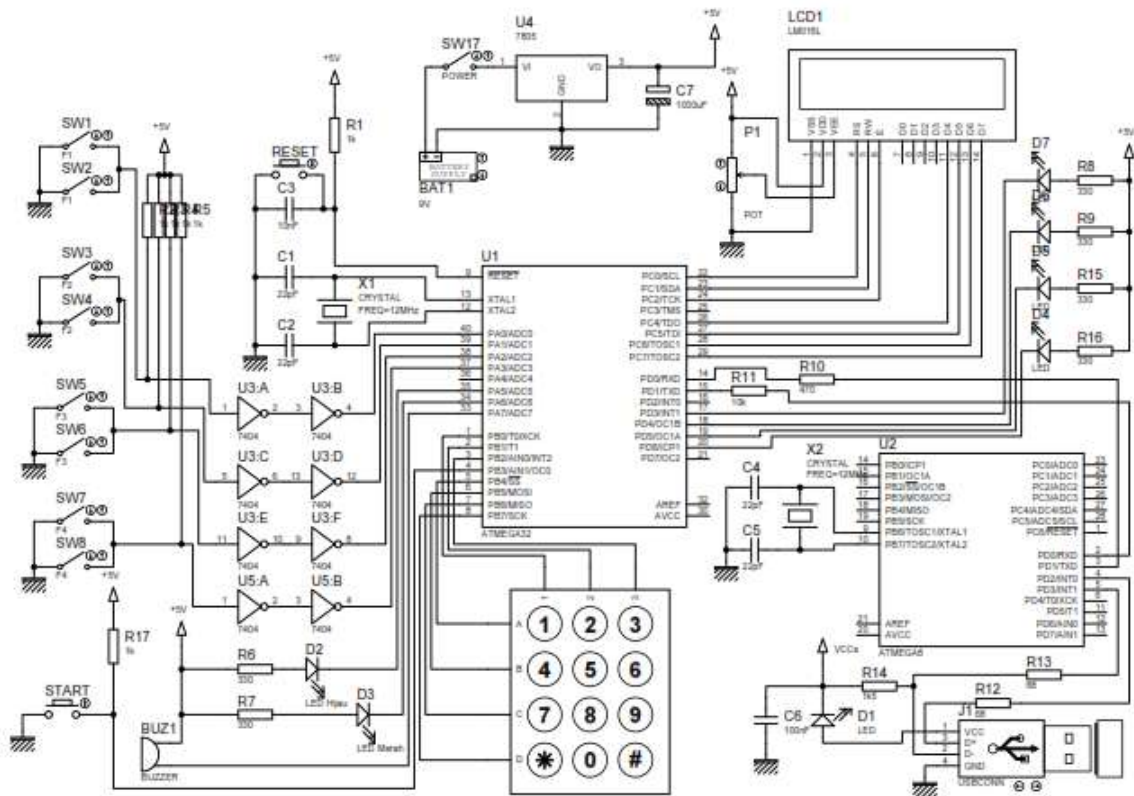


Fig. 4. Schematic Agility – Lay out components

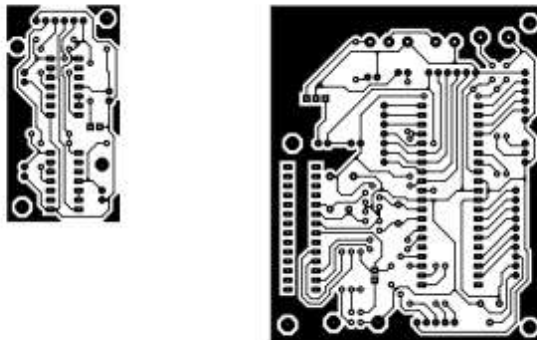


Fig. 5. Pcb agility (1)

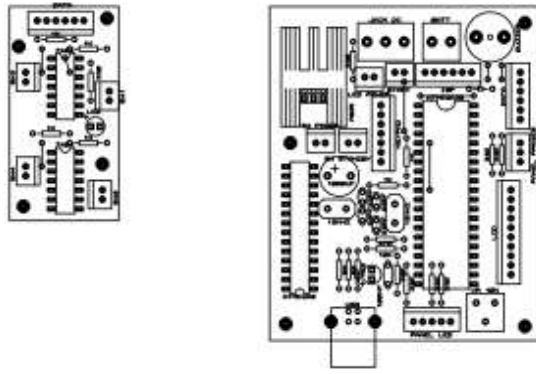


Fig. 6. Pcb agility (2)

The following is the image of the product development tool for measuring agility abilities.



Fig. 7. Tool for measuring agility abilities

Comparison of innovation test equipment balance :

No.	Existing Tool	Innovation
1	Price is quite high	Affordable prices
2	Foreign products	Domestic products
3	Electrical energy	Battery energy recharges
4	There is no memory in the device can be accessed in directly to laptop	There is a memory that can disconnect/copied to the laptop
5	Not portable	Easy to carry

Conclusion

This research aim to develop a tool to measure the agility physics component. The result showed that it has completed the manufacture of gauges agility ability. The tool has advantages such as relatively cheap price, domestic production, using a battery recharge, the memory can be connected with computer, easy to carry an others. This study came to the drafting of innovation, where as for product testing will be done at a later stage.

References

- Andi Suntada S. (2009). TES, PENGUKURAN, DAN EVALUASI DALAM CABANG OLAHRAGA. Bandung; FPOK UPI.
- Atmojo.M.B. (2007). Tes Pengukuran Pendidikan Jasmani/Olahraga. Surakarta; UNS Press.
- Beam.W.R. (1999). System Engineering Architecture and Design. New York; Mc. Graw Hill,Inc.
- Bompa and Tudor.O. (1999). Theory and Metodologi of Training. Iowa; KendallHunt Publishing Company.
- Espito and Thrower.R.J. (2001). Machine Design. New York; Delmar Publisher, Inc.
- Gupta,V, and Murthy,P.N.(tanpa tahun). An Introduction to Engineering Design Method. New Delhi; Tata Mc. Graw Hill Publishing Company Ltd.
- Hurst. K. (2006). Prinsip – prinsip Perancangan Teknik. Jakarta; Erlangga.
- Krutz. (2000). Design of Agricultural Machinery. New York; John Willey and Sons.
- Mas'ud.M. dan Mahmud.M, (2004). Kewirausahaan. Yogyakarta; AMP YKPN.
- Widiastuti. (2011). Tes dan Pengukuran Olahraga. Jakarta; PT. Bumi Timur Jaya.