INTERNATIONAL SPORTS SCIENCE STUDENTS CONFERENCE 2013

"Future Innovative Directions Of Sport – An Interdisciplinary Approach"

28-29 NOVEMBER 2013

SPORTS CENTRE & UM ARENA
UNIVERSITY OF MALAYA
KUALA LUMPUR
MALAYSIA
INTERNATIONAL SPORTS SCIENCE STUDENTS CONFERENCE 2013

"FUTURE INNOVATIVE DIRECTIONS OF SPORT – AN INTERDISCIPLINARY APPROACH"

ISSSC 2013 is organised to create a platform and opportunity for all sport science students to share knowledge, experiences and best practice pertinent to the formulation of a strategy that would guide fundamental sport science research. This conference strives for a more innovation-friendly interdisciplinary sports science research as well as recommendations for future research. It is also a good opportunity to meet people with similar interests and experiences who may help expand your network and circle of influence.

Field of studies among others include Sport and Exercise Physiology, Sport Pedagogy, Sport Management, Sport Biomechanics, Sport Sociology, Sport Tourism, Exercise Science, Health Promotion, Sport Officiating, Sport Nutrition, Sports Psychology, Sport Marketing, Sport Coaching & Training, Sport Technology and other sports science related fields.

Date: 28 & 29 November 2013
Venue: Sports Centre & UM Arena Stadium,
University of Malaya, Kuala Lumpur, Malaysia

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Welcome Message

Director of Sports Centre, University of Malaya

Assoc. Prof. Dr. Mohd Salleh Aman

First at all, Sports Centre, University of Malaya would like to extend a very warm welcome to all delegates and we thank you for participating in this conference and for your unwavering support.

The theme for this conference is: International Sport Science Students Conference 2013 (ISSC 2013) – Future and Innovative Direction of Sport. This conference provides invaluable resources for all coaches, sport science students & academicians and others involved in sports & exercise to share knowledge, experiences and best practice pertinent to the formulation of a strategy that would guide fundamental sport science research.

To the participants, I hope that you will have meaningful interaction with colleagues from other countries and take back home scientific knowledge that you will treasure.

Once again, thank you for your support.

Sincerely,

Assoc. Prof. Dr. Mohd Salleh Aman
Director of Sports Centre,
University of Malaya
Welcome Message

Secretary of ISSSC 2013

Dr Lim Boon Hooi

On behalf of the organising committees, it is my pleasure and privilege to extend a warm and cordial welcome to all our distinguished speakers and participants to ISSSC 2013.

The aim of this conference is to strive for a more innovative-friendly concentrate on interdisciplinary sport science research and recommendations for future research. At the same time, this conference will provide an opportunity for discussion between specialists, participants, coaches and researchers in similar interest and experiences toward the global future of sport science and last but not least, FREINDSHIP among all of us.

I sincerely hope that every participant will enjoy the conference and make it a memorable one.

Finally, I would like to congratulate the organizing committees for their hard work and commitment in making this conference a reality.

Sincerely,

Dr Lim Boon Hooi
Organising Committee Secretary
International Sports Science Students Conference (ISSSC 2013)
Keynote Speaker

Professor Andrew Cresswell

Prof. Cresswell completed his medical doctorate in Neuroscience from the Karolinska Institute, Sweden, in 1993. He remained at the Karolinska Institute and University College of Physical Education and Sports until 2005 when he joined the academic staff at the University of Queensland with joint appointments in the Schools of Human Movement Studies and Health and Rehabilitation Sciences.

Prof. Cresswell’s research interest is in the integration of neurophysiology and biomechanics (neuromechanics) to investigate the control of human movement. Particular research interests lie within the areas of: Motoneurone, reflex and cortical excitability during lengthening and shortening muscle actions; Neuromuscular fatigue; Reflex and voluntary activation of the abdominal musculature during controlled postural tasks.

STRENGTH AND POWER TRAINING FOR SPORTS PERFORMANCE

Professor Andrew Cresswell
Deputy Head of School
School of Human Movement Studies
The University of Queensland

In many sports, an athlete's ability to produce powerful movements is key to their performance and success. However, much of the literature around strength and power training is not clear when it comes to optimal training methods, and as such, strength and conditioning trainers are unclear about parameters such as optimal load, speed and range of motion. Muscle force production is governed by several factors such as cross-sectional area, length, velocity and activation. As muscle force is most often used to produce or resist joint rotations (torque), additional factors such as mechanical advantage, or the moment arm, of a muscle is also important. Muscle power is determined by the rate at which muscles perform work and is therefore influenced by how much force is produced while shortening or lengthening at a particular speed. For movements involving multiple muscles, the individual power contribution of each muscle is often ignored for the easier to measure whole movement power. Here I will present data on what optimal load should be applied to produce maximum leg power when performing the squat exercise. I will also show how this differs from the individual power contributions of the ankle, knee and hip that contribute to the overall squat performance. The information presented will help to inform sports scientists, strength and conditioning trainers and interested others on load management for power production.
Keynote Speaker

Dr. Nichola Callow

Dr. Nichola Callow, is currently the Dean of the College of Health and Behavioural Sciences, Bangor University, United Kingdom. Nichola gained her PhD from Bangor University in 2000 and is a senior lecturer in sport psychology. Nichola conducts research in three main areas: the cognitive and motivational effects of imagery, from both a behavioural and neuroscience perspective; group dynamics in particular transformational leadership, cohesion, collective efficacy and communication; and interventions with patient populations.

Nichola is currently and Associate Editor for the Journal of Applied Sport Psychology, and an Editorial Board Member for the Journal of Imagery Research in Sport and Physical Activity. Nichola has been a BASES accredited sport and exercise scientist (psychology) since 1999, a BPS Chartered Psychologist since 2000, and has extensive applied experience with International athletes from a range of sports.

THE COGNITIVE EFFECTS OF IMAGERY ON SPORTS PERFORMANCE

Dr. Nichola Callow
Institute for the Psychology of Elite Performance
School of Sport, Health and Exercise Sciences
Bangor University, UK

Imagery research has progressed considerably since Mahoney and Avener's (1977) seminal paper highlighted the differential use of imagery by successful versus non-successful Olympic trialists. Indeed, since this paper, research has highlighted that athletes use imagery for a wide variety of cognitive and motivational functions. Further, the efficacy of imagery for the acquisition and retention of performance has consistently been evidenced. More specifically, the efficacy of imagery is now known to be moderated by a number of factors including: the visual imagery perspective used; the modality of the imagery; imagery ability; and personality. In this keynote I will focus on contemporary research related to these specific moderators. In addition, I will present recent data relating to imagery perspective preference and the biological validity of the Vividness of Movement Imagery Questionnaire demonstrated via the application of functional Magnetic Resonance Imaging. Applied implications emanating from the research will be offered, including evidence based discussion on supporting coaches to delivery imagery to their athletes.
Program Schedule

WEDNESDAY 27 NOVEMBER 2013 CONFERENCE PROGRAM

Time
1400 – 1800 Registration

Time

THURSDAY 28 NOVEMBER 2013 CONFERENCE PROGRAM

0800 – 0900 Registration
0900 – 1000 Welcome Address by Associate Professor Dr Mohd Salleh bin Aman, Director of Sports Centre, University of Malaya
Opening Speech by YBhg Dato Dr. Ramlan bin Abd Aziz, Chief Executive Officer of National Sports Institute of Malaysia
1000 – 1100 Keynote Lecture 1
Presenter: Professor Andrew Creswell
(The University of Queensland, Australia)
Title: Strength and Power Training for Sports Performance
1100 – 1130 Morning tea (Multi-Purpose Room, UM Arena)
1130 – 1300 Oral Presentation
(DK A) Coaching and Fitness 1
(DK B) Sports
(BM 1) Psychological Activity
1300 – 1400 Lunch (Multi-Purpose Room, UM Arena)
1400 – 1530 (DK A) Biomechanics and Motor Control/Learning
(DK B) Sports
(BM 1) Coaching and Fitness 2
Psychology 2
1530 – 1600 Afternoon tea (Multi-Purpose Room, UM Arena)
1600 – 1700 Workshop 1 (Physiology Lab)
Workshop 2 (Physiology Lab)
Electro physiological Techniques in Sports and Exercise
Metabolic Demand at a Different Steady State of Intensity
Introducing a New Sport: “JOM Bola”

The Future is Light: An Exploration of Light Variable Resistance Training

Note: All sessions in DK A unless stated otherwise
Program Schedule

FRIDAY 29 NOVEMBER 2013 CONFERENCE PROGRAM

Time
0900 – 1000 Keynote Lecture 2
   Presenter: Dr. Nichola Callow
   (Bangor University, United Kingdom)
   Title: The Cognitive Effects of Imagery on Sports Performance

1000 – 1100 Morning tea (Multi-Purpose Room, UM Arena)

1000 – 1100 POSTER SESSION (Multi-Purpose Room, UM Arena)

1100 – 1230 Oral Presentation
   (DK A) (DK B) (BM 1)
   Sports Management 1 Coaching and Fitness 3 Exercise Physiology 1

1230 – 1430 Lunch (Multi-Purpose Room, UM Arena)

1430 – 1600 (DK A) (DK B) (BM 1)
   Sport Medicine and Exercise Physiology 2 Coaching and Fitness 4
   Injuries

1600 – 1630 Afternoon tea (Multi-Purpose Room, UM Arena)
   (DK A) (DK B) (BM 1)
   Coaching and Fitness 5 Sports Sports Management 2
   Psychology 3

1800 – 1830 Collection of Certificates

Note: All sessions in DK A unless stated otherwise
# Oral Presentation Schedule

## THURSDAY 28 NOVEMBER 2013

**Time:** 1100 – 1230  
**Oral Session 1**  
**Room:** DKA  
**Moderator:** Dr Lim Boon Hooi

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<td>Hariadi</td>
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<td>Soheyla Nazari</td>
<td>The Effect of Maximum Intensity Resistance Training on Environmental Movement Ability of Lower Limb in Women</td>
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<td>Noorzaliza Osman</td>
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<td>Stella ak James Martin</td>
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**Oral Session 2**  
**Room:** DKB  
**Moderator:** Dr Balbir Singh

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<td>Ima Fitri Sholichah</td>
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## Oral Presentation Schedule

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<td>Lai Ling Ling</td>
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<td>Parisa Tanoori</td>
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<td>6.</td>
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SMART balance test Innovation
Development tools : Simple, Cheap, Accurate, Responsible, and Measured
with a digital approach

Siswantojo1,2, Endang Rini Sukamti1, Faidillah Kurniawan3
1,2 Sport Science Faculty, Yogyakarta State University, Indonesia
3 Visiting Senior Lecturer, Sport Centre University Malaya, Malaysia

Abstract

Balance is a manifestation of the quality of a person's muscles and nerves. Today many people less attention to the element of balance in exercise. When the balance is an important element in daily activities. This study aims to develop a measuring balance with a digital approach. This study was included in research and development is done in a period of 3 years. This tool uses design innovation, microcontroller system, and infrared sensors. The results showed that the balance of the assays has measurement functions 4 samples at a time, using energy saver battery, capable of storing measurement data are quite a lot, portable and measurement results can be directly downloaded into the computer. Based on logical validity is valid because the measure tool compatible with the to be measured. Conclusion that innovation gauges static balance has been resolved, and declared valid with logical validity. The next stage will be a tool used to measure static balance to the athletes, non-athletes, diabetic patients, coronary heart disease, disability students and elderly.

Key words : development, tools, measurement, balance

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 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 Fundamental Decentralization Grant YSU.

At each appearance of sport skills required quality good biomotoric 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 biomotoric 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 the balance test, which has been in the test instrument known by the term standing balance test.

Simply put how technical testing capabilities on the standing balance test balance is testee standing on one leg test tool that has been provided with the eyes closed state / Strock stand. Subjects during the test - the length and then recorded how long it can withstand balanced (Widiastuti, 2011:144).
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 tools tend to be difficult not flexible when about to be moved due to arrangement of equipment and tools that are too much on the development of tools "SMART" (simple, Cheap, Accurate, Responsible, and Measured) balance test modification, which promises a different feel later on when they want to perform tests and measurements, this tool can be much easier to taken - take it and move on - move.

The test instrument is very in crave by athletes who did after getting the right exercise program so biomotor ability to increase significantly the measurement capabilities that biomotor really 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 instrument 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 tool "SMART" (Simple, Cheap, Accurate, Responsible, and Measured) balance test modification and the tool can also be registered so that adds to its intellectual property wealth of Indonesian products. Another impact will provide opportunities in the domestic industry to innovate design measuring instruments other biomotor components, and formed a partnership with universities in developing the sports industry.

Specifically this study aims: first, to realize modification provides development capabilities biomotor special gauges to test balance measurement and evaluation capabilities biomotor, and both are able to acquire 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 to the complex nature of the tool that is simple.
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. Obtaining intellectual property rights over those KONI or tool 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 so modified and remains easy to use, maintain, prices and equipment maintenance costs are relatively affordable to raise the quality of athletes.

For universities, this study is the work of innovation and creativity in modifying existing tools with more capabilities, a 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 is the pride and real experience in working independently or in cooperation.

TARGETED RESULTS

Development tool “SMART” (Simple, Cheap, Accurate, Responsible, and Measured) balance test complex modification of the tool was developed in order to meet the needs of the domestic market and the needs of today's athletes which have a lot of athletes are capable of more than the maximum of the measuring instrument that there is, in addition to the performance tool was tested with calaxon-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.

LITERATURE REVIEW

Development tool modification “SMART” (Simple, Cheap, Accurate, Responsible, and Measured) balance test this modification 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.

A. balance

Equilibrium (balance): The ability of a person to control the organs that are neuro-muscular (Andi Suntonda S. 2009: 55). In line with that expressed by Widiastuti (2011: 144) who also explained that the equilibrium (balance) to maintain posture and proper body position while standing (static balance) or during movement (dynamic balance).
B. 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 merupakan 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 able to complete 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, kemudahan 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 Mahmood (2004: 35) modification is to give different look with pre-existing items. Modified differences can be developed that meet 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 the difference was much better than the other way same benefits, the differences can be understood by the user / buyer, the difference is not easy to imitate competitors, buyers can reach price difference, and the difference was financially beneficial and rare intact planing by Gupta and Muthy (TTT: 27).

Fig. 1. Step Design
C. spring

Function of the spring, according to Khurmi and Gupta (2001: 752), is to direct the force, measure the force, store style, dampen vibration. Further it is said that this type of spring is Helical Spring, Conical Spring, Torsion Spring, Leaf Spring, disc of belleville spring.

Term: the term in the spring is the free length, compressed length, and solid length, while the other terms associated with spring is the spring index formula and spring rate.

Basic formulas spring:

1. Spring index = \( \frac{D}{d} \)

2. Spring rate = \( \frac{W}{a} = \text{Konstant} \)

3. Generally spring load is a load for a spring press firmly and load punter.

4. Maximum voltage = \( \{ 8 \ W \ D \ \ (d) \} \times \{ 1 + (1 / 2 \ C) \} \)

5. Styles \( P = kx \) (Suharto, 2002: 7)

6. Power \( N = (1 / 2 \ k \ x \ ^{2}) / (1000 \ \ 1.75) \)

7. Velocity \( V = \frac{x}{t} \)

8. Style is retained by many springs in parallel \( k = k_{1} + k_{2} + ... + k_{x} \)

9. \( D \) is the diameter of the spring, spring wire diameter \( d \), \( B \) load, \( a \) decline, \( W \) load, compressive force \( P \), \( k \) konstante spring, and \( x \) deflection of the spring, shortening the time \( t \), and \( N \) power

D. Research roadmap

Table 1. Research roadmap

<table>
<thead>
<tr>
<th>Related research has been done</th>
<th>Research to be conducted</th>
<th>Continued research will come</th>
<th>Finalization of last follow-up study</th>
</tr>
</thead>
<tbody>
<tr>
<td>The data showed that equilibrium assay that has been there tends to be complex so it is difficult to be brought where - where, in the moving and storage place. With adanyapengembangan tool &quot;SMART&quot; (Simple, Cheap, Accurate, Responsible, and Measured) balance test this modification is designed to provide convenience to the user if want to carry, store, operationalize. The tool is only as biased scales folded but still based digital for recording the results of the test scores.</td>
<td>Assembly / formulation development tool &quot;SMART&quot; (Simple, Cheap, Accurate, Responsible, and Measured) balance test a prototype modification.</td>
<td>1. Testing tool development tool &quot;SMART&quot; (Simple, Cheap, Accurate, Responsible, and Measured) balance test modification to prospective users and the relevant interest 2. Scientific publications both nationally and internationally.</td>
<td>Tool development tool &quot;SMART&quot; (Simple, Cheap, Accurate, Responsible, and Measured) balance test can be tested and the modification has been proposed to obtain IPR</td>
</tr>
</tbody>
</table>

Research Methods

This study is a research and development. The research design used by Borg and Gall approach. Methods 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 static balance ability.

Borg and Gall, 1983, (in Nana Syaodih Sukmadinata, 2006:163) stated that development research procedure basically consists of two main objectives, namely: (1) develop the product, and (2) to test the 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

Start

Specification
Assertion
Alternative - an
alternative concept
Survey
materials and standard
components

years
I

Mechanical construction design tool
1. The design of components
2. The design excellence
3. Design size
4. Working drawings
5. The design of the process

Design software:
1. Encoding
2. Programming
3. Test
4. Operation and use
5. Configuration

making tool
Component manufacture, purchase standard components, and assembly

Experimental research sub. Mechanical systems
construction equipment in Lab. machine
Function test, service test, continuity test, performance
test, appearance evaluation, analysis of price

years
II

Testing / research models to potential
users: test performance, service, and
continuity test

Tahun III

Analysis of the results of field tests
Analysis input - input of potential users
Analysis of demands - demands of potential users
Repair and improvement tools
IPR registration

Lab research on the sub-system.
Mechatronics:

Completion tools and preparation of user

Finish
RESULT OF RESEARCH

The following is a picture of the mechanism of action of tools developed to measure balance.

Descriptions balancing tool:

Infra red sensor works by emitting light transceiver part to be received by the receiver section. If the light blocked by the foot of pan, it will impart information to the microcontroller. 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 no participants to the microcontroller.

Spesifikasi Komponen:
Sensor Infra Red : Transciever-receiver
Mikrokontroler : ATMega16
Keypad : Matrik 3x3
Display : LCD 4x32
The following is the image of the product development tool for measuring the balance.

![Image of the tool](image-url)

Picture: a tool for measuring the balance

**COMPARISON OF INNOVATION TEST EQUIPMENT BALANCE**

<table>
<thead>
<tr>
<th>NO</th>
<th>EXISTING TOOL</th>
<th>INNOVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Price is quite high</td>
<td>affordable prices</td>
</tr>
<tr>
<td>2</td>
<td>foreign products</td>
<td>Domestic products</td>
</tr>
<tr>
<td>3</td>
<td>electrical energy</td>
<td>Battery energy recharge</td>
</tr>
<tr>
<td>4</td>
<td>There is no memory in the device can be accessed indirectly to laptop</td>
<td>There is a memory that can disconnect/copied to the laptop</td>
</tr>
<tr>
<td>5</td>
<td>Not Portable</td>
<td>Portable / easy to carry</td>
</tr>
<tr>
<td>6</td>
<td>ost tests in the lab</td>
<td>Can be done in the field</td>
</tr>
<tr>
<td>7</td>
<td>One - tree sensor</td>
<td>Four sensor</td>
</tr>
</tbody>
</table>
Conclusion

This research aims to develop a tool to measure the balance. The results showed that it has completed the manufacture of gauges balance 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, can be used in the field and others. This study came to the drafting of innovation, whereas for product testing will be done at a later stage.

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References


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UNIVERSITY OF MALAYA

SPORTS CENTRE

INTERNATIONAL SPORTS SCIENCE STUDENTS CONFERENCE 2013

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