Research

Ts. Dr. Nasrul Hadi produces Protective Bandana (Pro-B) reducing the risk of injury to takraw players

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PEKAN, 4 September 2023 - Sepak takraw is one of the sports that has the potential to bring medals to Malaysia, but it is only contested up to the Asian Games level.

Although it had begun to be competed professionally around 1960, the development of takraw technology which was seen as poorly developed, was one of the factors that this sport not being successfully competed in the Olympic Games.

Among them are equipment technology during training, the takraw ball technology itself, more suitable attire and the safety of takraw players.

Starting from that, the Director of the Centre for Advanced Industrial Technology, Centre for Innovation and Commercial Management who is also a Lecturer at the Faculty of Mechanical and Automotive Engineering Technology (FTKMA), Ts. Dr. Nasrul Hadi Johari, 38, produced a Protective Bandana (Pro-B) that should only be worn by takraw players in accordance with the suitability and comfort that will reduce at least 50% of the hit impact from the takraw ball header.

The idea of Pro-B development was the result of an initiative with members of the Human Engineering Group based in FTKMA, namely Dr. Mohd Hasnun Arif Hassan, Nik Haikal M. Hassan and Dr. Zulkifli Ahmad@Manap.

Pro-B : Protective Headgear Bandana for Sepak Takraw Player

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CO-INVENTORS : DR. HASNUN A. HASSAN, DR. ZULKIFLI AHMAD, DR. SYIFAK IZHAR HISHAM

PATENT: UI2022002604



BACKGROUND



- **Sepak Takraw**: One of the most play sport in Southeast Asia, but **high chance of injuries**.
- Takraw **ball speed** up to **78 km/h!**
- During **intensive training**, players head the ball more than **300 times**.





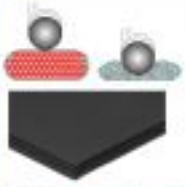
Unfortunately, the **bandana** does not serve as a proper headband for the player safety!

- Possible for **traumatic brain injury**.

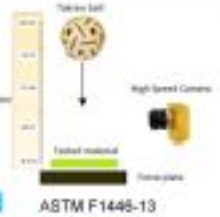


Improve the equipment:
Protective Bandana (Pro-B)

STATE OF THE ART / METHODS



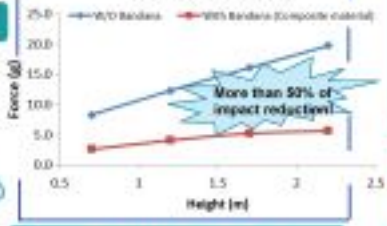
Impact absorption material:
Polyurethane



ASTM F1446-13



Brain Acceleration



NOVELTY / BENEFITS

- **Safe** headgear and comfortable
- Reduce **impact more than 50%**
- Reduce headache when heading high speed Takraw ball.
- Not against ISTAF.
- The first of its kind, **first in the world!**
- Very good for kids and beginner!

Patents Searched MyIPO

COST ANALYSIS

Items (per unit)	Estimation Cost (RM)
Padded material and fabric	33.00
Tailoring and cosmetic	10.00
Marketing	2.00
Total:	45.00

EXISTED HEADGEAR in THE MARKET



No headgear for Sepak Takraw

The closest protective head gear for soccer, the price:
Full 90: RM 165

STATUS OF INVENTION

Criteria of Invention	Status
Product Development/Market Readiness	Done / User acceptance tests
Functionality of Product	Function well for the final prototype
TRL Level	7
Status of Finished Product	Demonstration in real environment (TRL 7) ✓
Lab Report/ Documentation	Lab validation ✓ Demonstration to Sepak Takraw Players (Novice and Professional) ✓ Player's feedback survey ✓

PRODUCT IMAGE

A novel protective bandana with shock absorbing material (**Polyurethane**) was created based on anthropometry data that suits not only forehead, but whole frontal region.



Modification of traditional bandana for the first prototype





Type of bandana fabric:
Cotton



Features of Pro-B

- **Advance Head Protection:** Reduce Takraw ball impact by 50%
- **Excellent in absorb perspiration:** Pro-B fabric and inner impact absorb material keep the player's head comfortable.
- The padded section **covers crucial impact zones** of the forehead
- **Lightweight:** The weight is less than 40-gram, dimensions 70 x 70 cm, padded area thickness 0.5 cm.
- **Improve** heading ball control
- **Very good for kids and beginner!**

Status: TRL 7

ENVIRONMENTAL/SOCIETY IMPACT

- Promote safety in Sepak Takraw Sport
- Waste recycler

INDUSTRY / RESEARCH PARTNERS

MARKETABILITY

PUBLICATION

- Johari, N. H., Hassan M. H. A., Ahmad, Z. (2022). On the necessity of using safer bandana for Sepak Takraw ball heading. LNME (Scopus) 2022 (Accepted)
- N. H. Hassan, Johari N. H., Hassan M.H.A, Ahmad Z., (2022). Head Injury Evaluation Strategy for Sepak Takraw Ball Heading: A Systematic Review. J. Mech. Eng. & Science (Submitted)
- Ishak N. S. (2021). Development of protective bandana for Sepak Takraw player. Undergraduate Final Year Thesis
- Hassan M. H. H. et al., (2021). The Influence of Ball Impact Angle on the Brain Deformation in Soccer Heading: A Finite Element Analysis

According to Ts. Dr. Nasrul Hadi, for takraw to be competed at the international level, such as in the Olympic Games, this sport needs to be competed in at least 75 countries spanning four continents in

the world.

“Sepak takraw uses the feet and head as the main components in the game; however, with the nature of a hard takraw ball, even though it is springy and always hit at a high speed exceeding 50 km/h, heading a takraw ball using the forehead is painful and dangerous.

“Especially in intensive training, takraw players will usually head a takraw ball hundreds of times to improve ball control skills.

“The prolonged pain of heading the ball can lead to injuries to the players’ head including the risk of injuring parts of the brain,” he said.

He added that this issue needs to be considered and they took the initiative to focus on ways to reduce the risk of injury to the players’ heads by providing a liner that can be worn directly on the head to reduce the hit impact from the ball.

“The development of Pro-B actually started as early as 2013 but stopped for several years because I continued my Doctor of Philosophy (PhD) study and resumed in 2019 with support from the UMPSA itself, namely through research product grants (PDUs), before being fully completed in early 2021.

“Pro-B will be on the market for RM45 a set.

“We hope that Pro-B can reduce the risk of injury to players’ heads, including to children or those who have just started playing sepak takraw,” he said.

This can thus promote the sport of sepak takraw to be contested in countries that are still unfamiliar with the sport.

“It is hoped that this product can help takraw sport to be competed at the international level, such as in the Commonwealth Games and Olympics and further develop the sports-related industry in Malaysia.

“In addition to Pro-B, we are in the process of preparing a takraw ball launcher that will be used in training sessions.

“This equipment will help improve the performance of players and certainly improve the technology of this sport,” he said.

He added that so far, they are in the process of collaborating with several parties, namely the Pahang State Education Department (JPN), the Pahang State Sepak Takraw team and the nearest takraw associations to supply the Pro-B set.

“They will use it in training sessions, including in tournaments.

“School children will definitely like this Pro-B and will be more interested in the sport of sepak takraw which in turn will promote this sport more widely when they grow up,” he said.

This research won a gold medal in the Creation, Innovation, Technology and Research Exposition (CITREx) 2022.

The research also won a gold medal at the International Invention, Innovation and Technology Exhibition (ITEX) 2022 which took place at the Kuala Lumpur Convention Centre (KLCC) on 26 and 27 May 2022.

By: Nur Hartini Mohd Hatta, Centre for Corporate Communications

Translation by: Dr. Rozaimi Abu Samah, Faculty of Chemical and Process Engineering Technology

- 189 views

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