

WORKSHOP AND FEASIBILITY STUDY OF SWIMMING HIGH PERFORMANCE CENTRE, Dr. S P Mookerjee Swimming Pool Complex, New Delhi, INDIA

(September 11th to 13th, 2017)

A REPORT – To SAI, Administrator (Dr. SPM-SPComplex), Mr. Praveen Kakkar; cc to DG-SAI, Shri. Srinivas, DDG-SAI, Shri. Pradhan, Director Sports, Dr. Hooda, ED-NIS, Dr. Roy, and Manikant Sharma (AD, SAI and TIAS student, 2nd Batch), HPL-JNS-Dr. Dhingra / cc to UT, Prof. Sanada, Chairman-TIAS, Prof. Nakagawa, Provost, Faculty of Health and Sport Sciences, and Asst. Prof. Sengoku and Prof. Takagi, Japan Sports Experts (UT); Area Commons Chief - Mr. Tando; TIAS Office Chief – Mr. Nakayama

BACKGROUND

Welcoming the Japan Sport Experts (Dr. YASUO SENGOKU, Assist. Prof., UT and Dr. HIDEKI TAKAGI, Prof., UT) & coordinator Prof. Randeep Rakwal (UT-TIAS) (& Mr. Manikant Sharma, AD-SAI for his coordination till the final days of the workshop, which involved a pre-meeting with him to confirm the final points and pass-over to the Administrator, and with whom also a pre-meeting was held at the complex to confirm all the arrangements) to New Delhi by Administrator of SAI National Swimming Academy (at Dr. Shyama Prasad Mukherjee Swimming Pool Complex, http://www.sportsauthorityofindia.nic.in/index1.asp?ls_id=509), Mr. PRAVEEN KAKKAR on Sep 11th 2017, this first of a kind workshop was opened with attending 16 Academy and SAI Coaches and Sport Scientists from Delhi, Patiala & Bangalore. - The Workshop coincided with the Japan PMs Abe visit to India and meeting with PM Modi, Sep. 13th and 15th, 2017 where the cooperation on sport was also on the agenda (to quote from the Press Article from an Indian Newspaper, Indian Express - *“Prime Minister Abe welcomed the support offered by Prime Minister Modi for Japan’s efforts towards the successful organisation of the Tokyo 2020 Olympic and Paralympic Games. The two Prime Ministers noted with satisfaction the institutional linkages set up between India and Japan. They also acknowledged that the Olympic and Paralympic Games offer a unique opportunity for the two countries to further deepen their cooperation.”*) (<http://indianexpress.com/article/india/india-japan-joint-statement-during-shinzo-abes-visit-full-text-narendra-modi-bullet-train-mous-4843849/>) / (http://www.mofa.go.jp/s_sa/sw/in/page3e_000731.html).



Thank you Japan Sports Agency (International Affairs Division; Fujimoto san and Aya san) and Thank you Embassy of India (Dr. Rupal, Counsellor, S&T, and Sport)

- The Dr. SPM SPComplex, which was constructed in 1982 to hold Asian Games, holds the SAINSA, which was established in 2014, and became fully functional in 2015, as a fully

residential (26 boys and 12 girls, currently) academy. It has the **SAI Glenmark TIDM (Talent Identification Development and Management) nationwide initiative to promote the sport of swimming in India**, working with the Swimming Federation of India-and having a primary goal to find students across India with exceptional athletic talent; the Academy functions as a “**High Performance Centre for swimmers above 10 years of age**” (<http://sgtidm.com/>). Recently, the Team SGTIDM and Team GAF won 13 medals at the 9th Asian Age Group Championship at Uzbekistan, 2017. Thus, the **September WORKSHOP** of Japan Swimming Experts (with focus on both High Performance Science and Coaching) with Indian Swimming Experts (Administrators-Coaches and Scientist’s) was **highly opportune (appropriate and well-timed)** to share innovative cutting-edge scientific knowledge and coaching techniques and also to observe the swimming facilities (which were found to be world-class) and learn on the existing structure of coaching and development of swimming talent at the SAINSA, and understand the need for the establishment of the “High Performance Laboratory” “RESEARCH”, one of the main aims of the visit. **TIAS Academic Legacy** via transfer of knowledge was another aspect.

- The workshop/program schedule was as follows:

SPORTS AUTHORITY OF INDIA
NATIONAL SWIMMING ACADEMY - UNIVERSITY OF TSUKUBA / TAIKU, JAPAN
WORKSHOP AND FEASIBILITY STUDY OF SWIMMING HIGH PERFORMANCE CENTRE
SEP 11th -13th, 2017

MINUTE TO MINUTE PROGRAMME

Day 1: Monday (11th Sep.)	Day 2: Tuesday (12th Sep.)	Day 3: Wednesday (13th Sep.)
10:00 AM : Opening / Welcome Guests and Participants 10:15 AM : Welcome Address 10:30 AM : Swimming Academy & Program Overview 11:15 AM : Tea Break 11:30 AM: Topic 1: What is High Performance Sports, Sports Science? (SCIENTIFIC) ▪ Current Research in High Performance Sport: Swimming as a Case Study-Physiology (Y.SENGOKU) 01:15 PM : Lunch Break 02:00 PM : Current Research in High Performance Sport: Swimming as a Case Study-Biomechanics (H.TAKAGI) 03:30 PM : Tea Break 03:40 PM : Open Discussion 04:10 PM: Site Visit & Feasibility Study 05:00 PM : End of 1 st Day Programme	10:00 AM : Topic 2: Critical Aspects of High Performance Sports, Sports Science (PRACTICAL) A: Elite Coaching (Y. SENGOKU) ▪ Training for Performance ▪ Practical Aspects of Training ▪ Open Discussion 11:15 AM : Tea Break 11:30 AM : Session Resume 01:00 PM : Lunch Break 01:30 PM : B: Biomechanics of Swimming (H. TAKAGI) ▪ Basic Biomechanics in Swimming ▪ Practical tips for Swimming Faster ▪ Open Discussion 03:30 PM : Tea Break 03:45 PM : Site Visits 05:00 PM : End of 2 nd Day Programme	10:00 PM : Topic 3: Setting up High Performance Center / Laboratory ▪ Basic and Useful Equipment’s for Initiating Research and Training ▪ Scientific Equipment’s , Lists ▪ Review of the of the Workshop and the Requirement’s for the High Performance Swimming Center (HPSC) Establishment 11:30 AM : Tea Break 11:45 AM : Joint Discussion ▪ Q & A 01:00 PM: Lunch Break 01:45 PM : Others 02:15 PM : End of 3 rd Day Programme

DAY to DAY ACTIVITIES

2017, Sep. 11:

Day 1:

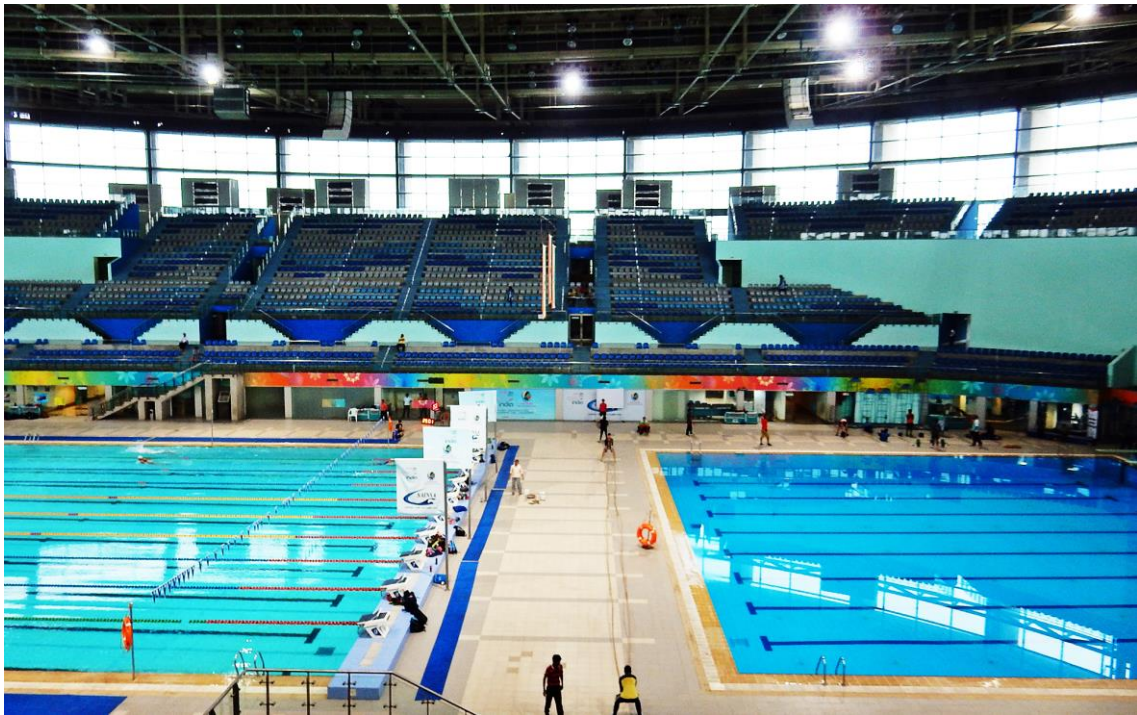
The **OPENING** was made by addressing the gathered participants for not only joining the workshop and giving time to it but also for welcoming us from Tsukuba for this first of, I hope,

many projects between SAI and University of Tsukuba-TAIKU-TIAS, and which was **initiated following the June 29th, 2017, visit of the Indian Delegation to UT**. Thank you Mr. Kakkar and Thank you Manikant; Thank you Drs. Sengoku and Takagi for delivering the main part of the workshop, as experts on HIGH PERFORMANCE SPORT SCIENCE, CURRENT RESEARCH and BIOMECHANICS, and ELITE COACHING. I would also like to humbly say that we (from University of Tsukuba) have come here to Delhi (SAINSA) not only to **SHARE** the knowledge, science and research from Tsukuba, but also LISTEN to the distinguished Coaches and Scientists of SA, and discuss deeply on various aspects of HIGH PERFORMANCE IN INDIAN CONTEXT.



- Introducing the Swimming Pool Complex, **ADMINISTRATOR, Mr. KAKKAR** and accompanied by the **HEAD COACH, Mr. Partha Pratim MAJUMDER (SGTIDM)**, we were **impressed by the high-class swimming facilities (Main Pool, Olympic Size), Warm-up pool, and the Diving pool, for the young swimmers**, in particular; and their nice **residential quarters** within the complex. The basic rehabilitation center had a physiotherapist and massage therapist; and full medical facilities were within reach in the city.





- The **first TALK (High Performance in Swimming) was by Dr. Sengoku**, an Elite Swimming Coach (Head Coach) and Scientist, mentioning that we have top-level swimmer in UT, and these are also our research subjects. Therefore, as SAINSA have high-level swimmers (currently focusing on junior-level) they could be very good research subjects – in order to apply the latest scientific techniques and research to improve swimming performance. Thus, Dr. Sengoku focused on the nature of the research he is conducting in order to **scientifically judge and improve performance based on evidence**. In the case of standards for selecting swimmers, the

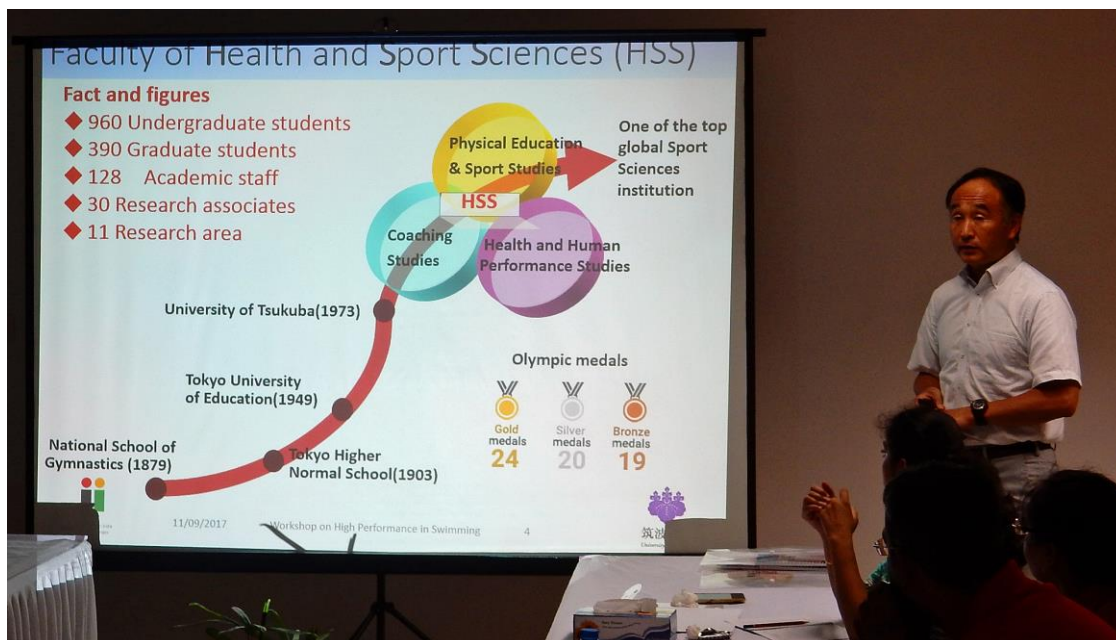


standard time by FINA is followed but Japan also has its own unique standards (1.5 sec faster) by the JSF. How can we achieve high performance?: based on the study of energy systems, anaerobic – lactate; high: sprinters/low-middle distance. It does not mean higher is better, the physiological parameters are very important. Giving the example of an Olympic-level male swimmer, Mr. Masaki, he explained the **energy systems**. Moreover, the laboratory, training regime and equipment's are necessary for **not only selecting the top swimmers but also for talent identification**. It is also "good for motivating the swimmers". Additionally, supplement usage [L-Citrulline (it is an amino acid found in watermelons), LEGAL], recently developed by a Japanese company is also used. On a question from the participant about calorie intake, nutrition aspects that is not focused on but carbohydrate intake is important, and rice is very nutritious in Japan. In this context, NUTRITION would make a very good research topic comparing India and Japan. Scientists as Coaches are very important and that is what is seen in Japan. There were numerous questions: kinetic studies for the blood lactate levels; Talent identification – how scientific is it in Japan – performance based testing and at what stage; Heart rate is the limiting factor (not being tested in UT); What do you have to say on the Michael Phelps case, his body (somethings are common-this is science, but comparative

studies are needed); Cycling-running-diet, the chamber; Psychology to motivation (not working at it in UT); Communication to coaches, how are you doing it? (Coaches are scientists, and that helps in UT/Japan case). In all, the LECTURE & DISCUSSIONS gave **GOOD INSIGHT, VERY PRACTICAL INFORMATION to the PARTICIPANTS**, which was their response.

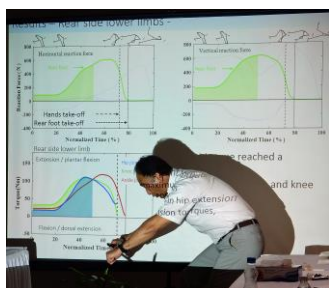
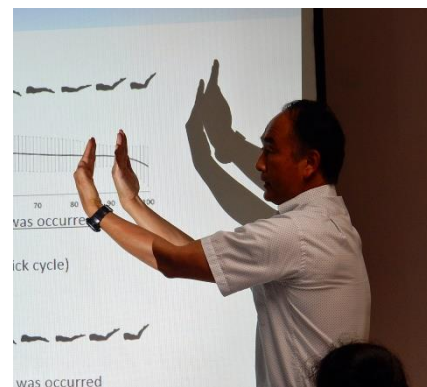
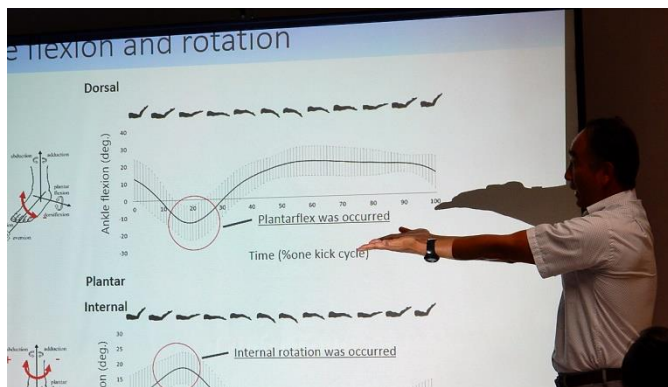


- The **second TALK (Current Research in Swimming High Performance)** was by Prof. Takagi, an engineer-hydrodynamic, by training and a biomechanics professional (was Head Coach-Japanese Men's Water Polo Team, and Scientific Committee of JSF), presented at first about the University of Tsukuba and the Faculty of Health and Sports Sciences (TAIKU), one of the top global sport sciences institutions, with a rich history of Olympic medals; and with a diverse range of sport science facilities, including the sport performance and clinic laboratory,



wind tunnel testing laboratory and the circulating water channel (swimming robot). Prof. Takagi shared (by not only slides but also by demonstrating with elegant hand and body motions) the latest scientific research being conducted on **FLOW VISUALIZATION DURING SWIMMING, and INVESTIGATIONS REGARDING THE START, both essential research components for high**

performance in swimming. Experimental footage was also shown during the talk. Although highly scientific and complex, the methods and data analysis were explained as clearly as possible and with take-home messages, and the participating scientists and coaches had deep interactive discussions. The **swimming pool video recording systems and the development/innovation of equipment's for reaction force measurement on the block, reference markers (LED), EMG analysis** was also shown and explained, which generated great interest among the participants.

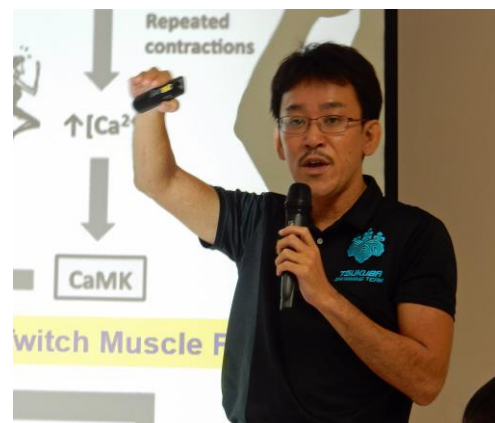


2017, Sep. 12:

Day 2:

Following the **first day's "Breaking the Ice" and developing close communication, interest and active participation among the Japanese and Indian delegations**, the workshop moved to the second day TALKS and INTERCATIONS.

- The **third TALK was by Dr. Sengoku**, on **Practical Aspects to Achieve High Performance in Swimming**, and dealt with the Characteristics of swimming training; literature about swimming training-volume or intensity; High-intensity interval training; Practical training regimen; and New concept for training planning. Beginning with the parameters of training - "*You must swim until you become a fish*" (Hironoshin Furuhashi - slide 3, Dr. Yasuo Sengoku - presentation), the 200 m Backstroke was explained in terms of energy and velocity, to physiological concept to enhance athletic performance, to raining effects between high volume and high intensity training – including in young swimmers; to **WHAT IS EXTREME HIGH INTENSITY TRAINING?, the TABATA PROTOCOL**; and explaining the latest research – Training for Performance – The PRACTICAL ASPECTS. How to introduce NIIT in real training situation was explained in detail, followed by the MECHANISM of each training effect, and the **TRAINING PERIODIZATION** focusing on the question, What is training general fitness? The training program at UT was also described and discussed.



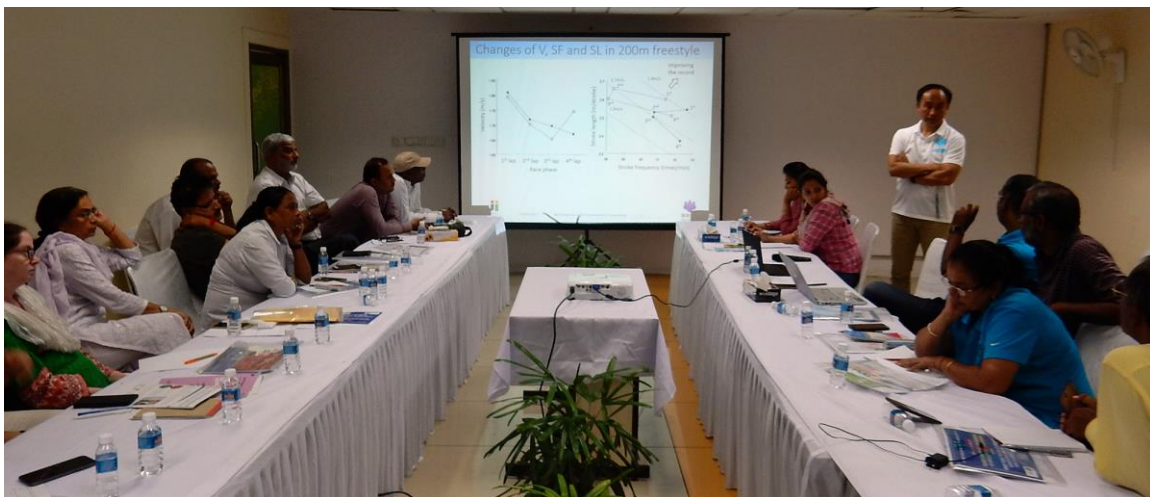
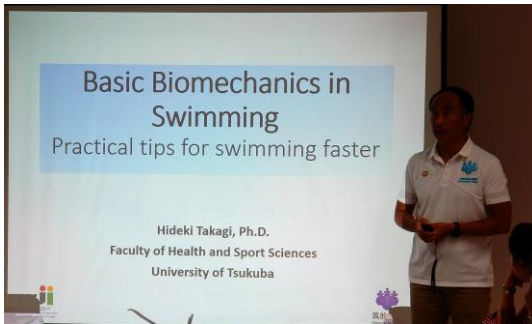
Participants were highly engrossed and asked multiple questions, on high volume and high intensity training; How long do the affects last (final volume to high intensity – it builds the

ENDURANCE CAPACITY); how does the coach apply this training (this was an IMPORTANT QUESTION); any effect of mitochondrial biogenesis; how many session per week (9-10 sessions); conventional training not followed-so what is the chance of injury (load is less in the WATER). **The importance of DAILY HIIT practice was emphasized, and its helps TEST the RESULTS of the SWIMMERS.** Finally, the discussions were centered on how to take all this science to the Indian context, and the need for JOINT RESEARCH LABORATORY and DEVELOPING JOINT RESEARCH PROPOSALS and working together for also training the Indian-side Sport Scientists in the latest research techniques would be a way forward to develop the Indian High Performance Centre, a goal of this visit and workshop. **The Indian Academy (SAINSA) is very good in one way, that it is focusing on sport more;** but sometimes the need for education and research is needed; i.e. working together with sport scientists in the institutes and universities. This is what is in the Japanese system, which creates better opportunities to develop sport science and help coaching for high performance.



- The **fourth TALK was by Prof. Takagi**, on **Basic Biomechanics in Swimming – Practical Tips for Swimming Faster-**, mentioning that Coaches have to consider that it “maybe” depends on the swimmers. The components factors for swimming performance were discussed, including **STROKE PARAMETERS** (swimming velocity-stroke frequency, length, index) and **HOW TO SWIM FASTER** (balance of drag and propulsion, the type of drag, how to reduce the drag, generating mechanism of the propulsion, and tips for increasing the propulsion). Does the stroke length increase the stroke frequency? What about Water resistance?, the Hydrodynamic force; all in context of **SWIMMING FASTER. The take-home message** was – that stroke length is strongly related to the stroking technique; stroke frequency corresponds to the muscle power output, endurance capacity; and to swim faster, a swimmer needs to maintain stroke technique regardless of fatigue situation and control of the stroke rate corresponding to anaerobic and aerobic capacity. **Giving the TIPS**, Prof. Takagi mentioned some points – “Increase stroke rate; How to reduce drag?; Pre-preparation of the entry; Is the propulsive force appropriate or not?.

Finally, the participants (Dr. Panigrahi, National Swimming Coach, SAI) mentioned that the **TALKS were REFRESHING, and they obtained NEW IDEAS**, and the most important was “getting something new” from this workshop.



- Following the workshop, in the evening, we had the chance to meet the Director (Sports), Dr. S. P. Hooda at Shashtri Bhavan (MYAS). Drs. Sengoku and Takagi and myself paid a courtesy call to Dr. Hooda's Office, and apprised him of the **Swimming workshop progress** and thanked him for his kind invitation to the same when we had a meeting in our University in June. Dr. Hooda was happy that we have followed up his invitation with a well-panned workshop, and wished us the best on its success, and future collaborations to follow. Discussing various aspects on our cooperation (SAI – UT) focusing on sports science and also coaching aspects, including the next football coaching program in end of September in Tsukuba, and the pre-Games training camps possibility in UT and Ibaraki prefecture, I informed of the plan of Joso City to submit a proposal through the Embassy of India, S&T counselor, Dr. Rupal (also in charge of the Sport portfolio). It was then, he recommended us to also meet the newly appointed DDG-SAI, Shri. Sandip Pradhan; for the Japan-India cooperation on SPORT.



2017, Sep. 13:

Day 3 (Final Day):

A) Site Visit to JNS- High Performance Laboratory:

Among the participants of the workshop, were **Senior and Junior scientists of the Human Performance Laboratory (HPL) at Jawaharlal Nehru Stadium (SAI)**; and we planned a pre-Day 3 workshop session, early morning visit to their laboratory and facilities with Mr. Kakkar. **Dr. Meenu Dhingra**, Chief Scientific Officer of the HPL along with other colleagues was there to welcome us all, and we had the company of 2 Biomechanics specialist also. The focus of the laboratory is on sports such as football and athletics; and the laboratory set up is also a new one, so at present, there are basic facilities and techniques for sport sciences; the lack of new technology, manpower and experts could be felt, due to the fact it is newly established. The discussion was on the fact that SAI wishes to take it as a **MODEL CENTRE for HUMAN PERFORMANCE CENTRE/LABORATORY**. The idea is to seek the support of Japanese Universities/Institutes for guiding towards it (HPL) Centre development. From our side, it was suggested that we can look for joint funding and establishment of joint research laboratory under DBT (GoI) and JSPS (MEXT), working together with the respective Embassies in Tokyo and Delhi.





In all, a fruitful visit, seeing the facilities and talking to the scientists on how to promote cooperation and collaboration in HIGH PERFORMANCE sector.

B) Being at the HPL, next to the SAI HQ, we received an appointment with the newly appointed - **DDG-SAI, Shri. Sandip Pradhan** -, and paid a courtesy visit at the **SAI-HQ**, along with Mr. Kakkar. It was very encouraging meeting, and Shri. Pradhan informed us of the new Sports Science University and set-up for the development of sports sciences, emphasizing on the education and courses and research to be conducted therein; and where hand-holding by the Japanese Universities/Institutes and colleagues/scientists would be required. Shri. Pradhan also emphasized the areas/sport disciplines of importance to India – Shooting/Wrestling/Boxing/Archery/Hockey/Badminton, for further cooperation; and others as – weightlifting/Tennis/Athletics/Swimming/Judo/Gymnastics. It was also emphasized that India will need support in areas of – **i) Visiting faculty for the Sports Sciences University and Research Centre’s – Game specific and sports science related, ii) Coach education and elite coaching training, and iii) establishment of a Sports Science Centre in Bangalore.** We also discussed the importance of trained manpower in the above for translating the knowledge to India, and also the technology for setting up advanced high-performance centre (such as the one in swimming for which we are having the workshop and feasibility study). This will also be a case study for the first phase of our cooperation and, once again, I requested the exchange of scientists and

coaches (foot is the next dedicated program we will do in Tsukuba, and whose result will help further guide our next-level cooperation's) on priority basis, which will be very helpful to the Indian-side in getting International exposure and seeing the system of working culture in sports sciences and coaching/education and training.



BACK to the SAINSA - WORKSHOP

C) CLOSING DISCUSSIONS WITH Swimming ACADEMY COACHES, SAI CACHES and SPORT SCIENTISTS:

Thanking all participants, Administrator, Coaches and Scientists and Professors from Japan, the floor was opened for discussion on the learnings obtained and knowledge shared, and specifically, the needs of the SAINSA need for setting up the High Performance Centre – one of the aims of the workshop.

POINTS RAISED, specifically in Swimming context/some general comments-

1. Grassroots level system of sport is a must for developing sport as a whole; as in done in Japan; and which started following the 1964 Olympic Games in Tokyo.
2. Emphasis on the “inculcation of high level of coaching with sound scientific support” is the best way forward; and the coaching at SAINSA is very strong, it was noted; however – presence of scientists is crucial for overall development.
3. As in Japan, the competition between Universities, for coaching and science, is very strong, and it helps raise the platform; across all sports is required as

- noted by Dr. M. D. Ranga; and Prof. H. Takagi mentioning that 40-years before it was the same situation for Japan.
4. Comment on the Delhi University and less involvement or lack of involvement in Sports Science was seen; and DU is involved in selecting the Teams. However, as noted above in Point 3), the Universities across India must use all available manpower, in sports science.
 5. Intervention (in sports context) by SAI will be needed, for changing grassroots level involvement and improvement, counselling sessions, follow-up programs after school; and most importantly a ROADMAP is needed.
 6. What is the case in Japan – continuously from 6 to 12 years, and up to high-school, the swimming is really important (island country, and need to survive). Prof. Takagi noted, India has advantage of high skills, and must be able to use them well. Dr. Sengoku noted, even before 1964, Universities in Japan was the place to train for swimmers; so education and sport went hand in hand.
 7. So, it is recommended to MAKE A PLACE where swimmers can swim; to make an ACADEMY (as is here) across India; the idea is to TRAIN & GET EDUCATION. So, in this sense, SAINSA is really doing well, a nice start.
 8. HIGH-PERFORMANCE – 15 to 25 years, long-term planning required.
 9. So, what do you need for Swimming, for the HPCentre? Specific support system for scientists (physiology and biochemistry, psychology, others). Why is a swimmer not performing? to sustain is a complex task. Need for all-round scientific support. The coaches to also try learn the science. Coach has the load; so scientists must be at the pool. Facility improvement, high-throughput scientific techniques for video motion capture and analysis; need for the swim flume system; how to measure the strokes, the lactate analysis; testing VO₂ max in water; identify room/lab location at the complex; needs for specialized equipment such as TOUCH PAD system, FORCE PLATE system (maybe need for less-expensive home-made system as in Tsukuba; technology import to India, including the new SUPPLEMENTS; revision of the fitness program and measures of accuracy (yes, Japan has appropriate suppliers); EXCEPT STOPWATCH WE HAVE NOTHING (there was frustration...); need for holistic technology support. Thus, a need for not only strengthening the science (Academic Centres), but also creating regional centres, Academies – the Process the Route must be mapped.
 10. TO **SUM-UP**: TECHNOLOGY – EQUIPMENT – COACH EMPOWERMENT BY

SCIENCE. Need for the “SWIM FLUME SYSTEM” at least at SAINSA. EXCHANGE program for SWIMMERS with Japan. JOINT RESEARCH between India and Japan – A comparative study can be performed.



D) RECOMMENDATIONS

1. Submit a **PROPOSAL for Establishing** the High Performance Sports Science Laboratory at **the Dr. SPM SPC-SAINSA, New Delhi.**
2. Included in the above proposal, **simultaneously/ in parallel, set up a MECHANISM with a targeted goal** of having some **Sport Scientist's** (including the Biomechanics Experts – we met 2, Dr. M.D. Ranga, who said he was almost at the end of his career, so he would suggest to help train the younger scientist/biomechanist from Bangalore-Dr. Pravin Nair) **and Coaches and Swimmers** to visit University of Tsukuba (3-4 days site visit & Seminar on University of Tsukuba Swimming Center and Research Aspects of Science and Biomechanics) and **observe (and discuss) the whole system from Science to Coaching to Training**, which will help the matching of Indian-side needs and appropriate support to be provide from the Japanese-side. This should be done in this fiscal year, and following the SAICON2017 Conference in Delhi, so that a **DETAILED PROPOSAL can be SUBMITTED** for consideration by SAI for the above Centre; and hold further discussions on other regional HPCentre's set-up.
3. Have a SKYPE meeting with those concerned on the **next agenda and prepare for a follow-up meeting** during SAICON2017, in Delhi.

SUMMARY

The **Workshop & Feasibility study** was a **highly interactive time with 2-Day four talks/lectures on latest topics** in SWIMMING RESEARCH, HOT TOPICS and PERFORMANCE through BIOMECHANICS and ELITE COACHING, and **hot discussions with each TALK**, along with site visits to the swimming pool, and culminating on **Day-3 with detailed feedback session/discussions** on workshop outcomes & requirement for the HIGH PEFORMANCE CENTER & meeting and appraisal of the progress to **Director Sports, Dr. S.P. Hooda** (MYAS, Shashtri Bhavan), who had extended this invitation at University of Tsukuba (TAIKU-TIAS) joint meeting, and finally with a Courtesy visit to introduce the Japanese delegation to the **SAI, Deputy Director General, Sh. Sandip Pradhan** that resulted in a fruitful discussion on the **NEXT-STEPS forward for the India-Japan cooperation on Sport**, as formalized during the 2 countries, Japan and India, Prime Minister's Annual Meeting in India, Sep. 13 to 15, 2017.

Thank you.

Dated: October 10th, 2017 (revised, Oct. 16th)

Signed: 

Randeep RAKWAL, Ph.D., Professor
(Coordinator, UT [Japan] - SAI [India] Projects)