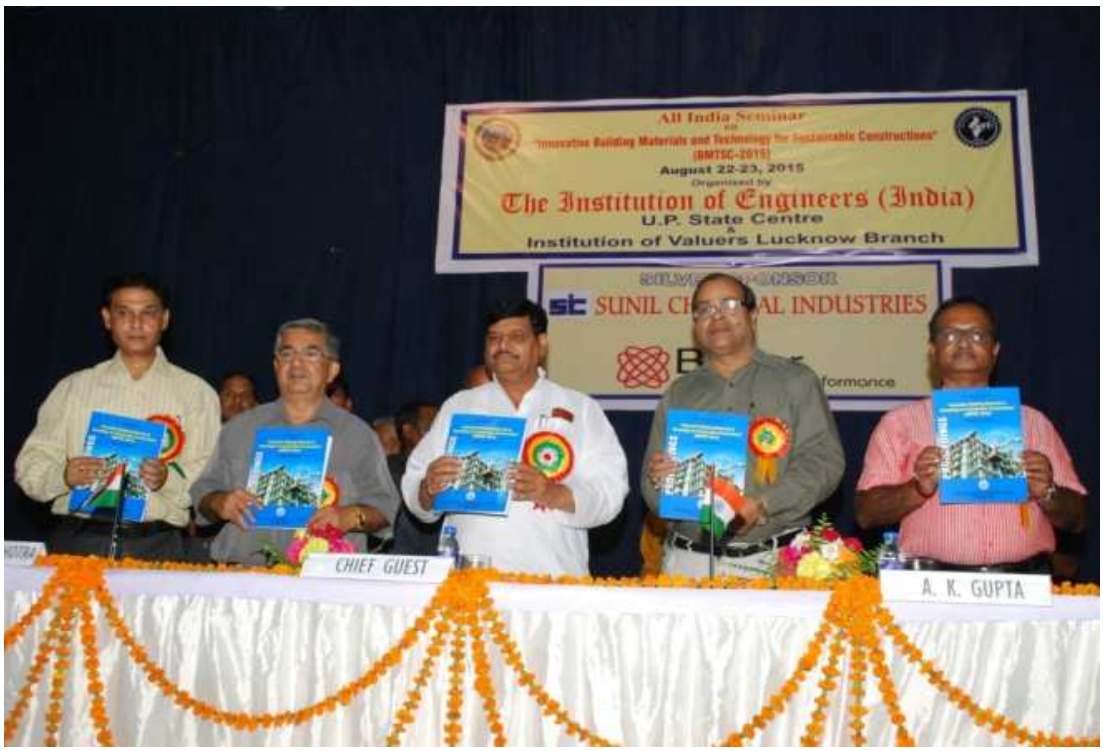
Report on All India Seminar on BMTSC2015

UP State Centre of the Institution of Engineers (India) organized a two day All India Seminar on the theme, 'Innovative Building Materials & Technology for Sustainable Constructions on 22-23, Aug. 2015. The chief guest Sri Shiv Pal Singh Yadav, Hon. Minister PWD and Irrigation, Uttar Pradesh appreciated and said that it was a matter of pride that the Institution of Engineers, State Centre organizes seminars and workshops on significant technical themes at regular intervals to enhance the knowledge and keep the engineering fraternity update. He also opined that the technology now a days is changing rapidly and so the Engineers should become aware of and use latest high quality technological developments in the construction of Roads, bridges, buildings and other construction work to make it economical as well as sustainable . While conveying his best wishes for the success of the seminar, he was hopeful that the participants from various part of the country will conclude the seminar with quality decisions to help the state in its further growth.



Release of Souvenir from left to right Shri Anind Sarkar, Shri Praveen Malhotra, Hon'ble Minister Shri Shivpal Singh Yadav, Shri A K Gupta, Shri Awadhesh Kumar

During the inaugural session the keynote speaker duo architects Sri Anind Sarkar from PWD, UP and Smt Suparna Sarkar informed, through their presentation, that in conventional Construction of buildings flow of natural air and light was ensured but now a days we are ignoring it using forced air and artificial lightings. Use of refrigeration appliances and Air conditioners at present has made the atmosphere hot, resulting into ill effect at Global level. He said that an internal air flow in a building at 1 m/sec reduces the temperature by 10 Degree Celsius. one must be aware that use of 'Desert Coolers' creates problem of increased humidity as well as it helps to grow fungus virus too. In his proposed technique he allowed the fresh air to flow inside the building and the hot air present inside the building is blown out, using 'Bernoulli' and 'Geo thermal heat exchange' principles together. He claimed successful design of a farm house situated at Lucknow-Kanpur road on this technique.

Chief Guest also released the souvenir, presented by Sri Awadhesh Kumar, Convener of the Seminar.

Earlier Chairman, UP State Centre Sri Arvind Kumar Gupta welcomed the members and the guests and at the end Sri Praveen Malhotra delivered the vote of thanks. Sri Awadhesh Kumar, State Centre Committee Member convened the sessions successfully.

Technical Sessions of AI Seminar

On 22nd August three technical sessions were held. In the **first session** two speakers presented their papers. Presenting the paper on the theme **'Earthquake and other Dynamic Effect Resistant Constructions', Ms Manideepa Sarkar** told that normal buildings and typical method of construction during earlier days lack basic resistance to Earthquake forces and emphasized a strong need for materials that are both sustainable as well as earthquake resistant. She presented some cost effective solutions for constructing seismic resistant buildings in developing countries and identified the techniques and methods for making these buildings earthquake resistant and she also recommended affordable earthquake resistant construction methods which might be cheaper and safer.

After that **Ms Deepali Mahto** presented her research paper on **'Fibre Reinforced Concrete'**. She said that it is very natural to develop rust in the steel reinforced concrete, in a span of 25 to 30 years due to humidity. For this reason use of B785 steel fabric was considered appropriate which is found Chemically inert towards rust. She informed that after research and experience of years-together use of 'Macro Synthetic Fibre' by M/s Bonar was found effective with a lower cost too. This practice reduced the waste of sand and soil as well. She specially emphasized the use of 'Poly propylene fibre reinforced Concrete' design for the buildings at Sea shore areas. According to her these 'Poly propylene fibre reinforced Concrete' has shown impact resistance values well in excess of double the amount of plain concrete.

A view of Audience attending the Seminar

In the **second session** four papers were presented. Sri A K Sinha, through his presentation on **'Seismic Resistant Buildings –Builder's guide'** first defined earthquakes, its type its occurrence, causes and effects. Then he spoke about types of seismic waves, seismic performance and design along with steps involved in Seismic design of buildings, shear walls, special techniques like base isolation use of energy dissipation devices quality control, IS code involved etc.

Dr Y P Gupta presented the paper on **'City and River Waste and Some Technologies for processing then to generate Resource for green construction'**. Describing the present state of pollution of River Ganga he opined that all type of waste, which at present is allowed to flow in River Ganga, can be recycled and reused in making different types of bricks and concrete and may be used in construction of houses and path ways. He presented the methods of processing of Non-Bio degradable waste , Recycling of plastic waste, use of polythene waste in making perforated Blocks, use of bio-degradable waste in making Manure or soil improvers as well as generating Energy from waste. In his opinion waste processing will be beneficial for the society in dual way. It will not only clean rivers but will also generate the availability of resources and employment.

Er. Ranjit Sinha, through his presentation on **'Housing for all by 2022 – Is it possible?'** said with confidence that the ambitious and most important plan of the Prime Minister for providing residences to all citizens by 2020 can be fulfilled. For this he gave the example of houses constructed in the village Indrapuri of district Rohtas in Bihar State, using Ferro cement technology. He also emphasized the need to consider the construction of house as a single unit regarding civil construction, water supply and disposal, subsidy for toilets or providing electricity through single window concept in contrast to the different departments for different works at present. He also presented and informed the social sites where one may view these construction activities.

The last paper of the session was presented by **Dr Santosh Kumar** on **'Impact on Environment of Global Construction activity'**. Through his presentation he opined that in all construction works special attention towards the protection of environment must be emphasized. For this he stressed the need for considering the cost for protecting environment, health hazards and re-strengthening the natural resources and it should be included in the estimates of the construction projects.

In the **Technical session III, Mr A L Kalra** discussed **'A look into the recent Innovating Building Materials'**. He told that a product made of three major materials (Cement, aggregates and water) in conventional concrete construction might be replaced by a typical durable concrete consists of six or more materials. Concrete mixes with fewer micro cracks can be produced by blending the cement with mineral admixtures either in the batching plant or in the cement plant which enhances the service life of concrete structures in a cost effective manner. He also gave description of Fly Ash as mineral admixture(conform to IS: 3812) for concrete; High Volume Fly Ash concrete (HVFA); Ground Granulated Blast Furnace Slag (GGBFS); Portland Slag Cement (PSC) and Condensed Silica Fume (CSF) and emphasized to use these innovative technologies for sustainable structure.

Sri Shubhendu Vikram Singh presented a very useful paper on '**Spatial distribution of Physical and Chemical Parameters of water in Lucknow District'**. For spatial variation of ground water quality, various parameters such as PH, TDS, Salinity EC, hardness were carried out through GIS and geo statistical techniques where as IDW (Inverse distances weighted) was used to obtain the spatial

distribution over the area. He presented the results in a tabulated form for various parts of the city. He found 77% of the sample within the desirable limit of 500 ppm but 33% sample were found exceeding the limit for TDS in drinking water as per IS standard(BTS-10500-191).

On 23rd August'15 two more technical sessions were held. In the session **IV, Ms Shiwali Sethia** presented a **'Study of constructive use of sugarcane Bagasse: A sustainable approach'**. In the background of industrial and agricultural waste reduction research for economical, environmental and technical reasons she found sugar cane bagasse fibres(a fibrous residue remaining after sugarcane stalk has been crushed and the juice removed) may be used as a secondary reinforcement for cement composites. Through her paper three different contents of SCF (Sugar cane bagasse fibre) were considered, using cellulose pulp as secondary micro-reinforcement to improve the resistance to the appearance of micro cracks. In her study she found that the combustion of Sugar cane bagasse yields ashes namely Sugar cane Bagasse Ash(SCBA) which contains high amounts of unburned silicon and alluminium oxides as main components and its use in blended concrete had been found to have significantly higher compressive, tensile and flexural strength compare to that of the concrete without SCBA but the cement should be replaced with SCBA up to maximum limit of only 10 %.

Ms Akanksha Gupta, an Architect, found that construction with mud is the answer of our waxing housing problems. Quoting the examples of various ancient constructions such as Great wall of China, grain stores of Ramasseum in Egypt etc. she described that properly built rammed earth can withstand loads for thousands of years and rammed earth using re-bar, wood or bamboo reinforcement can prevent failure caused by earthquakes or heavy storms too. Through her paper **'Timeless mud'**, she gave reasons to use mud as a construction material because it requires minimum fossile fuel consumption i.e. Energy efficient, its recycling does not need fossile fuel and require less labor with same characteristic of recycled soil as the original in contrast to modern building materials which acquires inferior character after recycling, availability in abundance makes it affordable for larger section of the society and thus can meet the huge deficit of housing demand with limited resources on all front. She advises the use of Wattle and Daub reinforced with straw hair or other ibrous material. She also advised use of compressed Earth Blocks.

In **technical session V, Sri Siddhant Agarwal** presented his paper '**Bamboo as an alternative Reinforcing material'**. He said that Bamboo is natural, cheap, widely available and most importantly strong in both tension and compression and is one of the suitable replacements of reinforcing bar in concrete in place of steel. He presented a concise summary regarding bamboo reinforced concrete beams, permanent shutter concrete slabs and columns. He recommended further study in this area regarding treatment of Bamboo to make the construction more sustainable.

Sri Praveen Kumar Gupta presented the paper on **'Relative Performance of high damping Rubber Bearing and friction Pendulum System for a curved Bridge'**. He said that Horizontally curved bridges are not only essential at several places due to geometric restrictions and constraints of limited site space but also aesthetically these pleasing structures are competitive at costs, with reference to straight bridges. He opined that selection of isolations bearings for a curved bridge is complex and challenging and in continuation he presented the comparison and relative performances between High Damping Rubber (HDR) bearings and Friction Pendulum System (FPS) isolation bearing.

Dr A K Jain, through his paper, **'Sustainable toilet construction using sustainable material and technology in rural environment'**, said that *it is better not to have a toilet than to have a toilet with faulty treatment system and wasting water*. He presented Bio-Digester Technology of Defense

Research & Development Establishment (DRDE), Gwalior, which is now known as ‘Bio tank’, and found it as a low cost alternative of the conventional septic tanks, currently used by the public. He also presented the description of the Bio-latrine Technology of the Indian Railways and finally he presented a comparative study of Leach Pit System, DRDO technology and Indian Railway Bio latrines with different characteristics such as space requirement, ground water pollution, geographical areas of use, water sources distances, Max and Minimum use criteria, Cost, Effluent discharge etc.

Following recommendation emerged out of the Seminar:

For earthquake and seismic resistant buildings and other constructions more R&D is needed for waste management which might be used in construction along with protecting environment and strengthening the natural resources and would take care of health hazards as well. R&D on Bamboo, available in abundance in our country, may be done, to use it as an alternate reinforcing materials,