NEWS CLIPS

October 20-26, 2018

Highlights of the Week@IITD

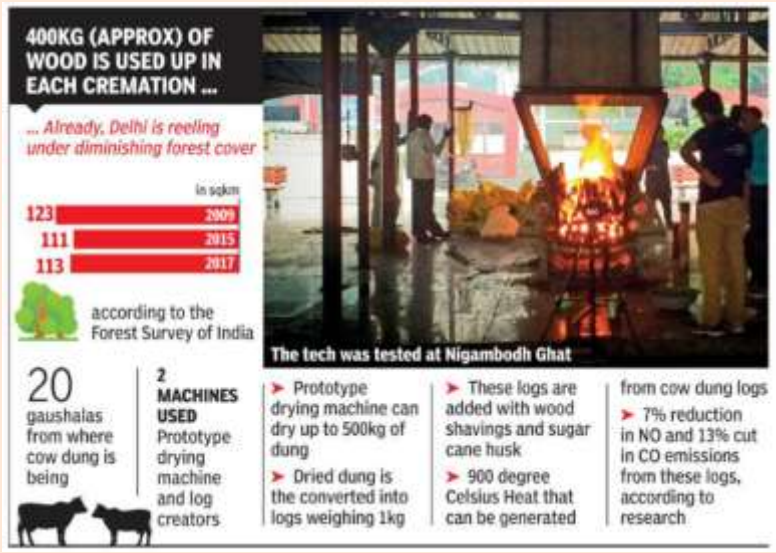
IIT-Delhi kids help last rites go green with cow dung logs

October 21, 2018 https://timesofindia.indiatimes.com/city/delhi/iit-delhi-kids-help-last-rites-go-green-with-cow-dung-logs/articleshow/66299257.cms

A team of 40 IIT Delhi students has devised a way to fight air pollution - by replacing wood with cow dung "logs" during funerals.

The "environment-friendly technique" also seeks to reduce deforestation by cutting down dependence on wood. "Arth, an initiative by Enactus IIT-D, targets replacing wood as a fuel at Delhi's crematoriums," said Faraz Mazhar, a member of the group.

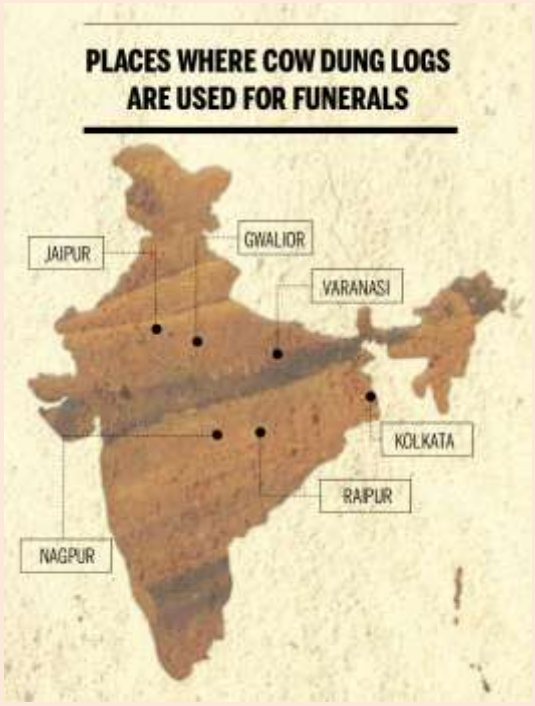
According to his teammate, Shalaka Patil, each of India's over 7 million cremations every year requires about 400kg wood. "Therefore, there is a need for an alternative fuel that is not only renewable but also minimises pollution," she said.



During a survey, the team found that at times 50 cremations - mostly using wood - take place at Nigambodh Ghat simultaneously. They also got to know that several gaushalas and dairies in the city face an acute problem of disposing of cow dung.

"Many of them have no option but to dump the dung in waterbodies or in empty plots," Patil said.

This, according to Mazhar, leads to pollution and clogging of waterbodies and land spaces. "This also creates unhygienic conditions in gaushalas for both cattle and workers." Arth attempts to resolve both problems at the same time, Mazhar added.



'No religious issue as cow dung used for centuries'

The team has developed a prototype drying machine based on the “greenhouse” principle — it traps heat and takes the temperature inside to upwards of 50ºC. “The dried dung is then passed through a log-making machine,” said Raj, a mechanical engineering student.

Last December, the team tested the fuel during the cremation of an unclaimed body at Nigambodh Ghat. “We saw positive results — there was less pollution and the process was smooth. We are now working on manufacturing a machine that will help us produce more logs,” Raj said.

Awadesh Sharma, in charge of Nigambodh Ghat, said the initiative “could become a viable option in the coming future”. Although the burning ghat has both wood and CNG facilities, most people prefer wood as they burn better, he said. “If we have enough dung ‘logs’, we can push for a third option.” People shouldn’t be concerned about the use of these “logs” due to religious reasons “as cow dung has been used in cremation for centuries and even now villagers use it during funerals”, said Sharma.

October 26

QS Asia Ranking 2019: IIT Bombay, IIT Delhi, IIT Kharagpur made it to top 200

https://www.indiatoday.in/education-today/news/story/qs-asia-ranking-2019-iit-bombay-iit-delhi-iit-kharagpur-divd-1376099-2018-10-26

QS Asia Ranking 2019: Of the 19 Universities from India that have made it to the top 200 Universities in Asia, 8 are IITs.

The QS Asia Ranking 2019 has been recently released and Indian institutes have improved in rankings as compared to previous years.

QS Asia Ranking 2019: 19 Indian institutes made it to top 200

A total of 19 Indian institutes have made it to top 200 with IIT Bombay leading the pack at 33rd rank.

Top three universities of QS Asia Ranking 2019

- National University of Singapore
- The University of Hong Kong
- Nanyang Technological University, Singapore and Tsinghua University

Of the 19 Universities from India that have made it to the top 200 Universities in Asia, 8 are IITs. The names and their corresponding ranks of the Indian Universities are given below:

List of Indian Universities in QS Asia Ranking 2019

- Indian Institute of Technology, Bombay (33)
- ***Indian Institute of Technology, Delhi (40)***
- Indian Institute of Technology, Madras (48)
- Indian Institute of Science, Bengaluru (50)
- Indian Institute of Technology, Kharagpur (53)
- Indian Institute of Technology, Kanpur (61)
- University of Delhi (62)
- Indian Institute of Technology, Roorkee (86)
- University of Hyderabad (106)
- Indian Institute of Technology, Guwahati (107)
- University of Calcutta (134)
- Jadavpur University, Kolkata (137)
- Banaras Hindu University, Varanasi (156)
- Institute of Chemical Technology (UDCT), Mumbai (167)
- Anna University, Chennai (169)
- Jamia Millia Islamia, Delhi (177)
- BITS, Pilani (180)
- University of Mumbai (187)
- Indian Institute of Technology, Hyderabad (198)

Recently QS India Ranking was released for the first time and here is a list of top IITs among them:

- IIT-Bombay
- IT-Delhi
- IIT-Kharagpur
- IIT-Kanpur
- Hyderabad Central University
- Delhi University
- IIT-Roorkee
- IIT-Guwahati

On June 7, the QS World University Rankings released its latest edition, which declared IIT-Bombay as India's top-ranking institution.

IIT- Madras: India's First 3D Printing Construction Technology for PMAY

https://accommodationtimes.com/iit-madras-indias-first-3d-printing-construction-technology-for-pmay/

Indian Institute of Technology Madras Faculty and Alumni have developed the country's first 3D Printing Construction Technology and have successfully built India's first 3D Printed Structure. Tvasta Manufacturing Solutions, an emerging additive manufacturing startup, and Civil Engineering Department, IIT Madras, have established a one-of-a-kind 3D printing laboratory – the IIT Madras Printability Lab – to take this indigenously-developed technology to the mass market.

The start-up aspires to completely automate construction, including placement of reinforcements and finishing, by re-envisioning the construction process. It aims to develop a platform and a specific process to a miniature single storey house of 320-sq.ft within three days. A prototype structure that has been printed in IIT Madras will serve a base foundational model for accelerating R&D and testing in Tvasta's road to making affordable sanitation and Affordable housing a reality in the country.

Prof. Koshy Varghese, Department of Civil Engineering, IIT Madras said, "Building Technology and Construction Management Division at IIT Madras is a unique Research Group in the country which has the expertise in materials as well as construction technologies which is relevant to this effort." He added, "We have been working on developing 3D Printing technology in the area of Construction from 2016 and have conducted International Workshops and awareness sessions for this in Chennai. In addition, the institute is exploring automated construction methods and novel formwork systems for rapid housing construction."

He also noted that IIT Madras worked on other housing technologies such as GFRG and Cold-Form Steel, which are now at a mature stage and can enable rapid construction to cater to India's massive housing demands. IIT Madras is collaborating with several government agencies and industry to

disseminate knowledge and establish standards, policies and processes to bring these technologies to the field.

Prof Manu Santhanam, Department of Civil Engineering, IIT Madras, who has been working with the Tvasta team, said, “3D printing of concrete gives a new dimension to construction. This technology can best meet the complex demands of modern architecture with concrete. The use of a combination of binders and optimally proportioned and sized aggregates, along with suitable chemical additives, the concrete mixture is fine-tuned to achieve the rheological characteristics that make it possible for extrusion of the material and shape retention after placement.”

Highlighting the benefits of this technology to the country, Kranthi ValluruAssistant Secretary, MoHUA, said, “Such technologies help in expediting construction with the optimal use of resources. They help in bringing a paradigm shift in the construction sector which is very much the need of the hour.”

This technology can also enable development of natural materials or geopolymers which can make the construction process very sustainable and green.

Talking about their plans, Adithya VS, Co-founder of Tvasta said, “The impact of 3D printing in construction will be primarily focussed towards the ‘Housing for All’ scheme under the Pradhan Mantri Awas Yojana and Construction of Toilets for the ‘Swachh Bharat Abhiyan’.”

IIT-Madras unveils indigenously-developed microprocessor

https://www.business-standard.com/article/pti-stories/iit-madras-unveils-indigenously-developed-microprocessor-118102601302_1.html

The Indian Institute of Technology-Madras Friday unveiled what it claims to be the first indigenously-developed microprocessor in the country that can be used in mobile computing devices, embedded low-power wireless and network systems.

The product would come in handy to sectors such as defence, nuclear power and government agencies, as it can reduce the threat from systems infected with back-doors and hardware Trojans, a release from the institute said.

Researcher in the institute, professor Kamakoti Veezhinathan, said in the release, "With the advent of digital India there are several applications that require customised processor cores."

The 'Shakti' family of processors was fabricated at semi-conductor laboratory (SCL) of Indian Space Research Organisation (ISRO) in Chandigarh, it said.

The launch would help reduce reliance on import of microprocessors, the release claimed.

The SCL is an autonomous body engaged in research and development in microelectronics to meet strategic needs of the country, it added.

IIT Ropar ready to share of technology with farmers for converting straw into acoustic boards

https://timesofindia.indiatimes.com/city/ludhiana/iit-ropar-ready-to-share-of-technology-with-farmers-for-converting-straw-into-acoustic-boards/articleshow/66370327.cms?

While the Indian Institute of Technology (IIT), Ropar has recently got down to developing a machine that can chop and load crop stubble into a trailer for ready transportation in one go, the institute on Wednesday decided to share yet another patented technology for converting the crop residue into expensive acoustic boards, without charging a single penny from the industry or farmers.

IIT Ropar director Professor S K Das said the mechanical department of the institute had developed the technology to convert the paddy straw into acoustic boards that are used for noise reduction in auditoriums, theatres, sound studios and other places and cost around Rs 5,000 per square feet.

He said the easy to use technique manufacturing the said board, using the press machine which is already available in the market, was developed by the institute in 2013 and was patented in 2016. “Keeping in view the enormity of the stubble problem in Punjab, the IIT has decided to share the technique with the industry and farmers without charging anything. Using the technology, the farmers can convert waste paddy straw into expensive acoustic board that at present are imported in India and cost too much,” he said.

Dr Naveen Kumar, under whom the technology had been developed and patented by the institute, said the project had been undertaken in collaboration with the Indian Plywood Industries Research & Training Institute. According to him, now the IIT has again sought grants for undertaking yet another project to develop additional technology that further strengthened the acoustic board so that it can be used as doors and windows as well. This, he said, would add value to the waste paddy straw and prevent the farmers from setting it on fire.

Dr Kumar said it was a simple process that can be applied to paddy straw which is available free of

cost and convert it into acoustic boards. “The process can be applied using a mechanised press after adding certain low-cost additives to the straw. The mechanised press costs around Rs 1 lakh and the investment can be required quickly given the fact that acoustic board were selling at a high price in the market,” he said.

He said as the farmers would be able to convert waste straw into expensive boards, the technology would eventually make farmers self-reliant. “A single machine installed at a village level can process around 10 tonnes of straw in five days and can be operated by a group of 10 farmers to take care of stubble of the entire village, Dr Naveen Kumar said.

The tech was developed by the mechanical department of IIT Ropar in collaboration with the Indian Plywood Industries Research & Training Institute.

It can convert waste crop residue into expensive acoustic boards that are used for sound reduction in auditoriums, theatres, sound studios and other places and cost around Rs 5000 per square feet.

The IIT is undertaking yet another project to further strengthen the board so that it can be used as doors and windows as well.

It can provide a cost-effective solution to the farmers to deal with the crop stubble.

The IIT has agreed to share the technology with the state industry and farmers without charging a single penny.

A single machine installed at a village level can process around 10 tonnes of straw in five days and can be operated by a group of 10 farmers to take care of stubble of the entire village.

October 25

IIT-Kharagpur society to tackle plastic use, segregation and disposal on campus

https://indianexpress.com/article/cities/kolkata/iit-kharagpur-society-to-tackle-plastic-use-segregation-and-disposal-on-campus-5417239/

The society, named ‘Vision Prabaho’, will also undertake projects to come up with innovative ways of organic, inorganic and electronic waste disposal. Over 500 students have shown their interest in joining.

Around 30 students of IIT-Kharagpur have taken up responsibility of reducing plastic use on campus. They are all set to form a society that will work towards creating awareness about segregation and disposal of plastic and e-waste, besides tackling other environment issues.

“Segregation of waste is one issue and another is disposing the waste or reusing it. We hope these brilliant young minds will be able to come up with some innovation for urban Indians as plastic waste is a problem for both urban and rural ecosystems,” said Barnali Chakrabarti, an environmental evangelist.

The society, named 'Vision Prabaho', will also undertake projects to come up with innovative ways of organic, inorganic and electronic waste disposal. Over 500 students have shown their interest in joining.

The group also performs street plays at the campus market as part of their awareness campaign. "We hold a great responsibility to actively participate in dealing with major environmental issues like irresponsible use of plastics, waste and resource management, conservation of water bodies, preserving bio-diversity and reducing carbon footprint in and around campus. We emphasize on human-induced environmental changes in recent years. We wanted to apply our own understanding to spread awareness and make changes," said Biswarup, a research scholar at IIT-Kgp.

"Vision Prabaho will be a unique society not just here, but across all IITs, considering that our campus is a mini-township and is witnessing challenges quite similar to urban areas, though at a smaller scale," said Professor William Mohanty, president of the Technology Students' Gymkhana at IIT-Kgp.

October 24

After granting autonomy to IIMs, Narendra Modi government turns attention to IITs, sets 7 member panel

https://www.financialexpress.com/education-2/after-granting-autonomy-to-iims-narendra-modi-government-turns-attention-to-iits-sets-7-member-panel/1359543/

The Narendra Modi government is all set to study the feasibility of granting autonomy of the Indian Institute of Technology (IITs) located across different cities in India.

The panel has been set up to explore the possibility of granting autonomy to the 23 IITs present in the country as a result of diluting government control over them.

The Narendra Modi government is all set to study the feasibility of granting autonomy of the Indian Institute of Technology (IITs) located across different cities in India. This move by the Union government comes eight months after an unprecedented autonomy was granted to the Indian Institutes of Management (IIMs). According to a report by the Indian Express, a seven-member committee has been set by the Human Resource and Development (HRD) Ministry under M Anandkrishnan, the former IIT-Kanpur chairman. The panel has been set up to explore the possibility of granting autonomy to the 23 IITs present in the country as a result of diluting government control over them.

The panel, that includes directors of IIT Madras, IIT Delhi, IIT Bombay, IIT Kanpur and IIT Kharagpur, is expected to study the feasibility of granting the top technical institutes autonomy and submit a report for the same in two months. Along with the study over the possibility of providing IITs autonomy, the seven-member committee has also been asked to suggest changes in the composition of the IIT's Board of Governors (BoG).

According to the IIT Act's Section 11, there are nine members in the Board of Governors of IITs. They are either directly or indirectly, nominated by the government. A committee member, as quoted in the report, said that outside India there are some of the best engineering schools whose board represent diverse voices and experience. The member further said that the board in such colleges have a strong presence in the alumni. On the other hand, the IITs have small boards, the composition of which is controlled by the government due to which there is no room for provision.

Along with the above, the panel also holds the responsibility of examining whether the Board of Governors should be empowered in order to amend the statues of the IITs that governs its day to day functioning.

IIT Bombay Team Wins International Social Innovation Award

https://jobs.siliconindia.com/career-news/IIT-Bombay-Team-Wins-International-Social-Innovation-Award-nid-205780.html

Indian Institute of Technology Bombay (IIT Bombay) project, Gram Marg, facilitating broadband access in rural India has been awarded the 2018 Impact Engineered Connecting the Unconnected award at New York City. Gram Marg's main aim is to empower rural India digitally by first and foremost bringing in Internet connectivity thereby empowering rural citizens digitally and in the due course, bringing rural India on board as a major contributor to economic growth and development. Gram Marg dedicates itself to not only technology innovation such as TV White Spaces and unlicensed 5.8 GHz Wireless in connecting the unconnected but also addresses connectivity from a sustainability point of view by seeding the growth of community networks, multi-stakeholder partnerships, and in-depth impact assessment studies of how connectivity has changed lives of people in the remote, rural villages of India.

Impact Engineered's Connecting the Unconnected Award will help Gram Marg increase academic collaboration in research and development, technology innovation, impact assessment-related collaborations, connecting to other teams working on similar rural challenges, and funding opportunities to enhance rural connectivity.

Gram Marg's mission is to perform research and development of solutions to connect the remote, un-served rural areas of India develop a scalable, low cost technology for affordable internet connectivity in the villages and perform research and development of solutions for implementation of applications and services in Gram Panchayat kiosks, Primary Health Care centres, schools and Anganwadis. Through their model and the creation of a sustainable business propaganda supporting Public Private Panchayat Partnership (4P model development), the team aims to study the social and economic impact of internet connectivity and leverage the understanding for a better growth.

October 23

Japan trying to connect with Indian youth: IIT-H director

https://www.thehindu.com/news/cities/Hyderabad/japan-trying-to-connect-with-indian-youth-iit-h-director/article25303330.ece

Urges Japanese companies to set up lab at IIT's Research Park

U.B. Desai, director of Indian Institute of Technology, Hyderabad (IIT-H), has urged Japanese companies to establish a lab at the Research Park on the institute premises.

Addressing a gathering of representatives from various Japan companies as well as students on the occasion of 'Japan Day' on Tuesday, Prof. Desai said over 100 students of IIT-H are presently pursuing higher education at Japanese institutes, and that has been made possible because of Japan International Cooperation Agency (JICA) programme.

"Japan is trying to connect with the youth of India. One of our students, Gopi Raju, who graduated in Japan, was posted at Silicon Valley by Toyata. We are aspiring for joint research and development with Japan industry. They are showing interest to collaborate with startups," said Prof. Desai.

Participating in the programme, Takashi Suzuki, director of Japan External Trade Organisation (JETRO), Bangalore, said, "More Japanese companies are taking note of your country and culture; India has one of the major human resources. We are [all] for co-invention and co-creation with Indians," said Mr. Suzuki, adding that they are planning to hold Japanese Academic Fair later this week at IIT-H.

About 10 companies from Japan, some of them already having branches in India, including Toshiba, Panasonic and Toyata Research Institute, participated in the programme and explained their line of activity and employment opportunities available with them. Dr. Kotaro Kataoka, JICA in-charge, also took part in the celebrations.

Coordinator Dr. Pradeep Kumar Yemula, Assistant Professor, Department of Electrical Engineering, who coordinated the event, said the twin objectives of the programme are to explore technology and research collaborations with Japanese companies, including Japanese investments in Indian startups, and to increase career and internship opportunities for IITH students with Japanese industry.

October 20

IIT Roorkee professor discovers lifesaving concrete application

https://www.indiatoday.in/education-today/how-i-made-it/story/iit-roorkee-professor-discovers-life-saving-concrete-application-1371817-2018-10-20

India Today Education brings groundbreaking research details of the application of 'Prestressed Concrete under Ballistic Impact Technology' by Prof Mohd Ashraf Iqbal.

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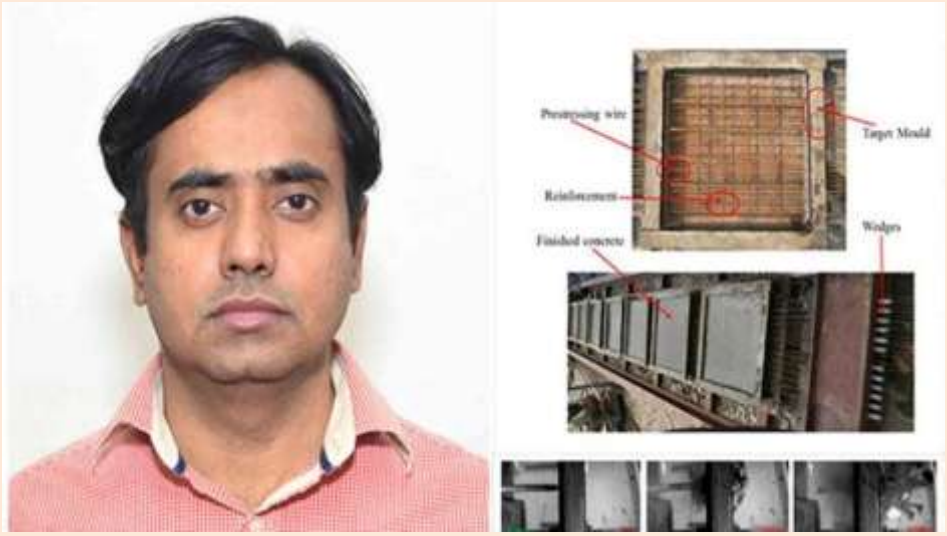


Mohd Ashraf Iqbal, Department of Civil Engineering, IIT-Roorkee (Photo courtesy: iitr.ac.in)

Prof Mohd Ashraf Iqbal from IIT Roorkee, India, is the first person to have discovered these meaningful changes in the application of prestressed concrete.

Every country assures security to its people irrespective of the difference in constitution and ideology. Apart from the army, navy, and air force, the Research and Development (R&D) sector plays a vital role in improving the security of a country.

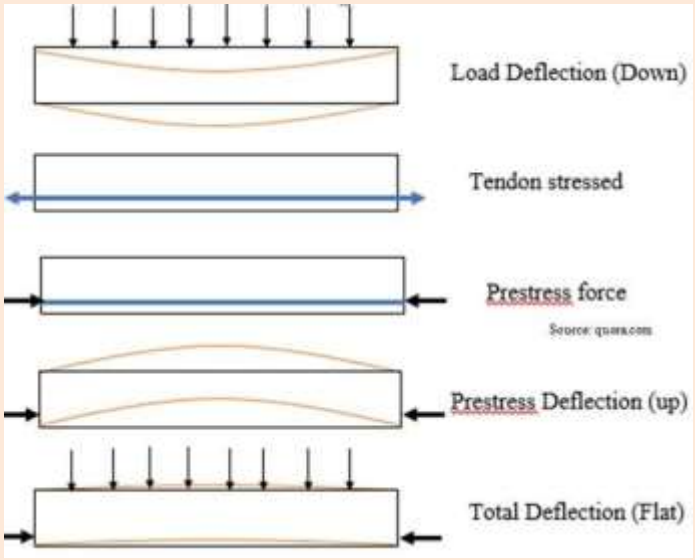
India Today Education brought some groundbreaking research details from the eminent minds working at IIT-Roorkee. One of the main innovations includes the application of the **'Prestressed Concrete under Ballistic Impact Technology' by Prof Mohd Ashraf Iqbal.**

While Prof Iqbal was a postdoctoral scholar at the University of Adelaide in Australia, he studied about prestressed concrete.

He has been researching on the same project until today under the **Department of Civil Engineering at IIT Roorkee** in India.

He has recently found some groundbreaking details about **the 'Ballistic Impact loading under Prestressed Technique'** for the first time in the world.

The project has already been awarded by the Department of Science and Technology (DST). A proposal for developing further insight in the prestressed concrete response to impact loading is under consideration at AERB, Atomic Energy Regulatory Board, and might be funded soon.

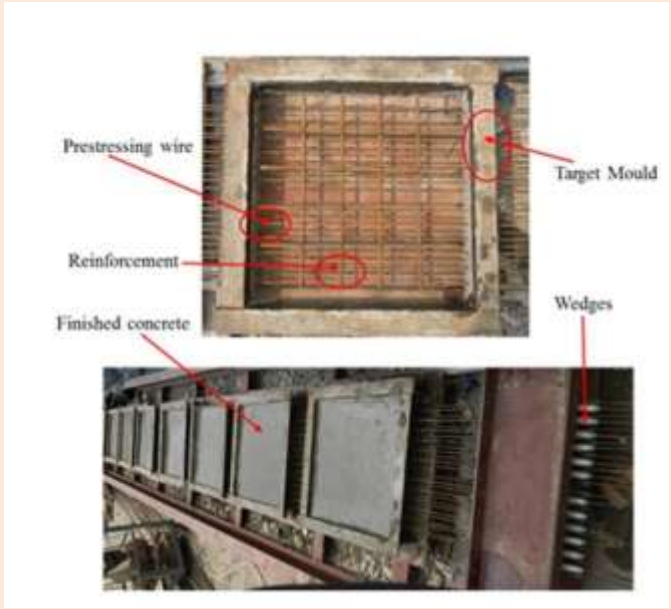


Behaviour of prestressed concrete member under flexure.

Why is the study on prestressed concrete technique important?

Prestressing of concrete enables reducing sections and crack width in the structural elements by eliminating flexural tension, and thereby making concrete more suitable for the construction of large span and un-cracked structures.

"Ballistic Impact loading under Prestressed technique is not being studied earlier," says Prof Iqbal.



Preparation of prestressed concrete target plates

Concrete is widely being used for the construction of strategic and important structures, such as:

- Nuclear containment
- Bridges
- Storage structures
- Military bunkers
- Railway tracks
- Concrete electric poles.

Perforation phenomenon recorded through high speed videography.

Features of prestressed concrete

1. Concrete is the second largest material which is being used by human beings after water. It is highly durable, fire, corrosion resistant and nonporous.

2. Prestressed concrete is primarily employed to reduce the sections and the crack width in the structural elements.

3. The utmost characteristic of eliminating flexural tension from structural elements has facilitated the prestressed concrete to draw widespread applications in strategic and important structures.

"This technique has been used in the construction of Delhi Metro bridges," says Prof Iqbal.

What is the significance of prestressed concrete under ballistic impact?

Basically, prestressed concrete is used in the construction of **nuclear containment structure**, a lead structure enclosing a nuclear reactor inside a containment which acts as a final barrier to radioactive release.

Structure of Nuclear Containment

In India we have double layered-containments, the internal structure is constructed by the prestressed concrete and the outer one is the reinforced concrete.

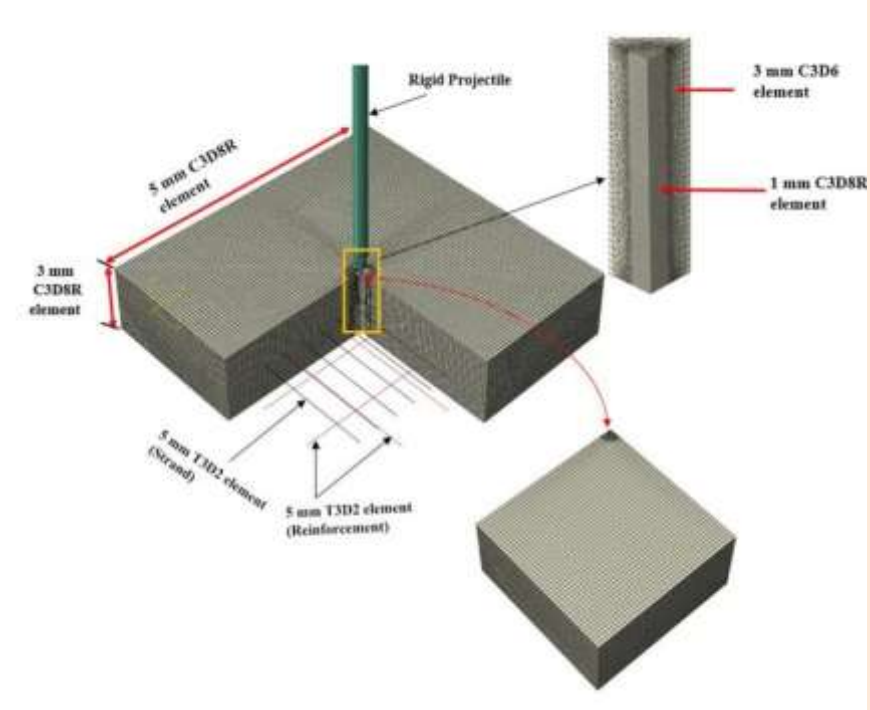
"Nuclear industry has the major application of prestressed concrete," Prof Iqbal said.

Negligence in the construction can lead to a leak in harmful radiations from the nuclear containment.

If an aircraft hit the containment structure or if there is a failure inside the containment due to some machine component, turbine blades, or any other element then chemicals and radiations may affect the environment.

"However, the ballistic impact theory guarantees that the prestressed concrete structures would absorb higher impact energy and offer better impact resistance," he further mentioned.

"Of course, any damage may lead to leaking of harmful radiations out of the containment," he said.



Finite element meshing details of prestressed concrete target

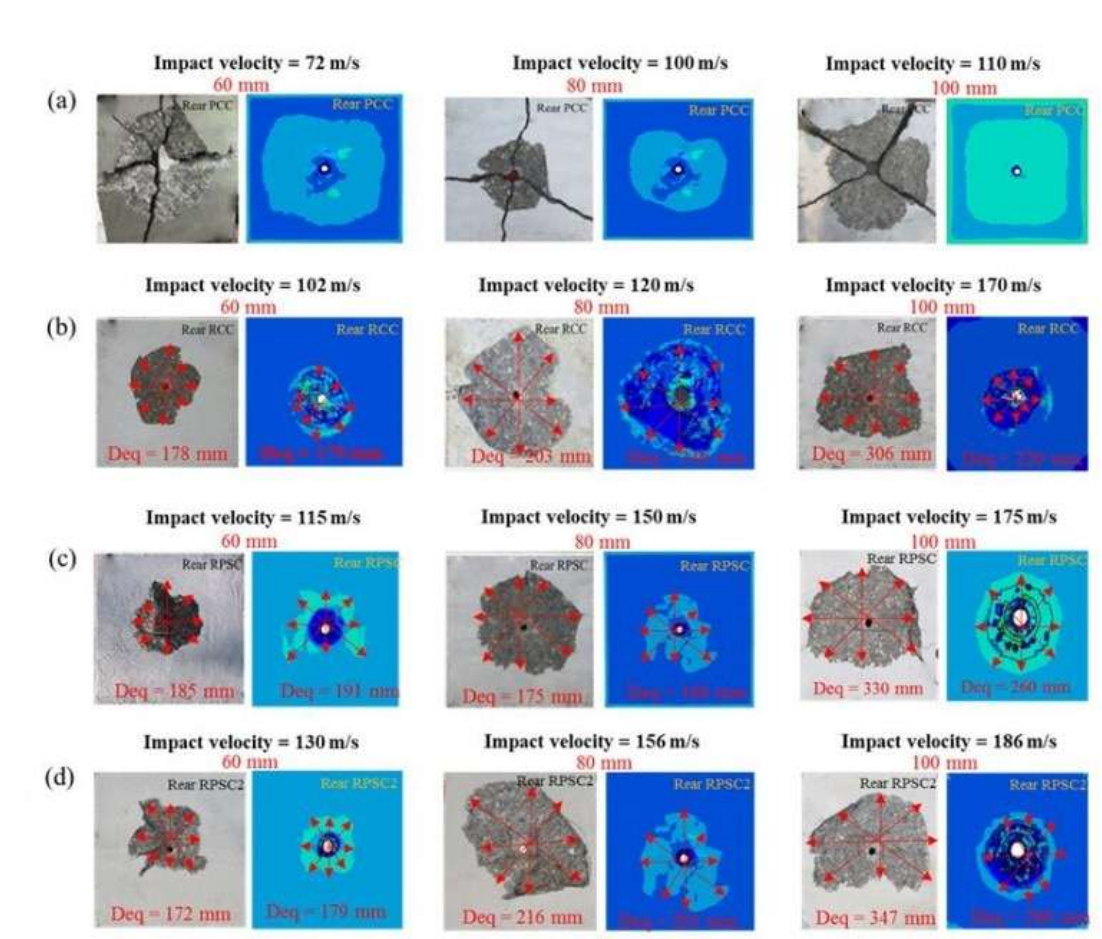
Prestressed Concrete under Ballistic Impact Technology is environmentally friendly

As the thickness of the structure gets reduced, less concrete is being used in the construction. Hence, a lesser amount of fuel and other requisite material is used in preparations.

Based on the present research, authors have published about five research papers in peer-reviewed international journals and also presented this research in many international conferences.

Experiment to show prestressed concrete is safer!

Damage and Energy Absorption Characteristics



Failure modes of (a) Plain, (b) Reinforced, (c) Prestressed concrete with 10 per cent initial stress and (d) Prestressed concrete with 20 per cent initial stress subjected to 1kg projectile impact.

In general, plain concrete targets underwent brittle failure.

Thick radial cracks, 3 - 7 mm wide, originating from the impact location, developed across the target thickness and traversed over entire span leading to brittle failure.

The number of cracks in almost all plain concrete targets was found to be four.

The reinforced and prestressed concrete targets, however, did not experience any visible cracking.

Numerical simulations accurately reproduced the failure in reinforced and prestressed concrete targets but cracking in plain concrete could not be predicted.

It has been observed that the magnitude of damage at the front surface was low and its variation with respect to projectile velocity, target thickness and type of concrete was insignificant.

The rear surface crater, on the other hand, had a significant influence on incidence velocity.

For a given concrete type and target thickness, the diameter of the rear surface crater decreased with the increase in projectile velocity.

This is due to the fact that the localisation of damage increases with the increase in strain rate.

The rate of decrease in the size of the crater with increasing velocity was prominent in prestressed concrete and least prominent in plain concrete.

For a given concrete, the volume of the rear surface crater (scabbing) increased with the decrease in incidence velocity and increase in target thickness.

The influence of velocity was most dominant in plain concrete and least dominant in prestressed concrete.

For a given thickness, however, the volume of scabbing was highest in the plain concrete followed by reinforced and prestressed concrete, respectively.

The initial prestressing thus proved to be effective in minimising the damage and improving the ductility of concrete.

It should be noted that the damage in the target due to projectile impact occurs due to the development of tensile stresses. However, due to the induction of initial compressive stresses, the magnitude of tensile stresses developed in prestressed concrete is low.

Therefore, the prestressed concrete underwent comparatively lesser magnitude of damage in comparison to reinforced and plain concrete targets.

Straw burning: IIT Ropar steps in to provide low cost solution

https://timesofindia.indiatimes.com/city/ludhiana/straw-burning-iit-ropar-steps-in-to-provide-low-cost-solution/articleshow/66292786.cms

With the government and the state farmers locked in a stalemate over bearing the cost of stubble management, the Indian Institute of Technology (IIT) Ropar has stepped in to provide a low cost stubble management solution by developing a machine that can pay for its operational cost by collecting stubble that can be sold for various purposes.

A research team at IIT Ropar, which is working under Dr Prabir Sarkar, has designed the machine that can be used to remove stubble and transport it, all in one go.

The machine that can be mounted on a tractor trolley can chop the stubble up to a few centimeters from the ground and automatically load it into the trolley without any manpower, saving labour and

cutting down extra spending on diesel, which are the two main concerns being raised by the state farmers.

Dr Sarkar said the design team is working on the prototype, which would provide an economically viable solution to the farmers. Elaborating further, he said, as of now the farmers were spending an additional sum of Rs 1,000 to Rs 1,500 per acre for using the straw management system (SMS) mounted on the combine harvester and then they have to spend on diesel and labour to use harrow on the field to prepare it for next sowing. But it has not provided a complete solution to the farmers as the operational cost remains a concern.

The machine that is being developed by the IIT Ropar would eliminate the need for SMS and then the harrow on the field and instead it will collect the stubble for the farmers that can be sold to biogas plants, bricks kilns or to the manure and hydrogen manufacturers. This can be achieved with a single run of the tractor in the field, Dr Sarkar said.

He said since the machine collect stubble, which would eventually pay for the operational costs, it would prove to be a most viable solution for the farmers.

“There are many straw management machines already available for the farmers. So, the research team at the IIT intended to come with a machine that can replace either the SMS or the bailer and also cut down the cost of operating the same,” he said.

After harvesting the crop with a combine (which is not fitted with the SMS) the farmers will be able to remove and collect the stubble with a single attempt using this machine which would wipe off the cost of using the harrow five times in the field. Besides, the stubble which would be collected, would be sold to compensate for whatever diesel or labour the farmer would pay for using this machine.

Dr Sarkar said the research team had conceptualized even better alternatives, but this design was finalized as its cost for the farmer will be somewhere between Rs 3 lakh and Rs 4 lakh, while other designs were proving to be costly.

He said besides developing the prototype to be mounted on a tractor trolley, the team was also designing a separate machine that can be put directly on the combine harvester and can further bring down the cost of operating a tractor trolley. Along with developing the machine, the IIT faculty has also established a stubble management group comprising experts from various departments, who are working to set up a society that would forge a supply chain linking the farmers to the biogas plants, brick kilns, manure and hydrogen manufactures for ease of selling the stubble, Dr Sarkar said.