Mission IBPs

Industrial By-products (IBPs) for Sustainable Infrastructure Development

an

Indian National Academy of Engineering, New Delhi

initiative

(Expert Group to Prepare Technology Roadmaps with Actionable Recommendations)

(a) Objective

1. Estimate the nature and scale of IBPs lying (unattended) at the major industrial units in India and their potential impact on the geoenvironment (i.e., air, soils/rocks/groundwater).

2. Assess the status of the existing, scientifically proven innovative and emerging, technologies for:

   (i) Valorisation of IBPs for different applications with particular reference to sustainable ecological and infrastructure development.

   (ii) Develop mechanisms and methodologies for monitoring the impact of IBPs on the ecosystem both (a) in their native and (b) re-created states.

3. Create policy guidelines through the GOI to identify IBPs as a manmade resource (viz. through in-situ or ex-situ neutralization, manmade soils etc.).

4. Create policies through the GOI for transportation of IBPs in bulk, from the place of disposal/stack to the place of utilization.

5. Create a task force in the 'mission mode' for the IBPs

6. Formulate of relevant codes/manuals/standards/guidelines, and

7. Enable the transition from **policy to practice**.

(b) Scope

With reference to the above, the following IBPs will be considered:

i. Bauxite resides (viz., red mud)
ii. Slags (viz., copper, steel)
iii. Dredged sediments
iv. Construction and Demolition waste
v. Overburden from mining
vi. Mine tailings
vii. Coal washery residues
viii. Agricultural waste
ix. Bio-mined waste
x. Ash from combustion.

(c) Proposed activities

The following activities are proposed:

1. Create a platform for interaction among professionals from different institutions/industry/consulting group/NGOs/Govt. bodies etc. to sensitize stakeholders on the extent of the challenges posed by IBPs and the potential of converting a liability into an asset.

   Taking stock of the IBPs (generation/handling/storage/utilization) and their impact on the geoenvironment.

   Review of the proven lab-scale technology(ies)/processes, which will fulfil the above-mentioned objectives.

2. Review of the available 'Technology demonstration' (read pilot-scale implementation) of the selected lab technology(ies)/process.

3. Recommendations regarding the refinement of technology(ies)/process based on the experiences during pilot-scale implementation and identification of parameters to scale-up

4. Review of field-scale implementation, if any, by industry and customisation of the technology(ies)/process considering the economies of scale.

   Conduct extensive literature survey pertaining to the norm and practices adopted for handling, disposal and the reuse of IBPs in other countries and the investment required for the same, along with the short- and long- term returns on such investments - in terms of environmental and other parameters.

5. Formulate policy inputs and recommendations for their incorporation in standards/manuals of government agencies and regulatory bodies such as Central Public Works Department (CPWD) and state PWDs, National Highway Authority of India (NHAI), Indian Road Congress (IRC), Bureau of Indian Standards (BIS) etc.

(d) A summary of the discussions/consultation with appropriate government agencies, if done, during the course of developing the proposal by the Expert Group

A brainstorming session involving delegates from various government agencies, regulatory bodies, policymakers and industry representatives was organised at IIT Bombay. The opinions and views of various stakeholders have been summarised and presented in *http://www.civil.iitb.ac.in/~dns/BSSIBP.pdf*.

(e) Motivation, novelty and justification of the proposed activity

While industrial establishments in India contribute to the growth of the economy through 'good' output, they have been struggling to deal with 'bad' output or 'industrial by-products' (IBPs). It is a challenge to turn this into a successful program of ***Waste to Wealth and Welfare (WWW)*** through recovery and recycling of industrial byproducts and waste into a well-defined policy. The bottlenecks in addressing these issues exist either due to lack of implementable and/or scalable technological solutions, or regulatory and policy issues that are causing impediments in adopting the recent innovative technologies. This activity demonstrates the feasibility and efficiency of the novel technologies on a field scale and provides actionable inputs and recommendations for policy formulation.

In this context, we have already conducted two-brain storming sessions:

1. **Industrial By-products for Sustainable Development"** held **at IITB on August 22, 2018,** *Proceedings are available:*
   http://www.civil.iitb.ac.in/~dns/BSSIBP.pdf
   https://www.cdeep.iitb.ac.in/webpage_data/events/GIAN_2018/Brainstorming_Session2018_P1.mp4
   https://www.cdeep.iitb.ac.in/webpage_data/events/GIAN_2018/Brainstorming_Session2018_P2.mp4

2. **Brain-storming Session on Centre for Geo-Environmental Research and Innovation (CeGReIn):** held **at IIT Bombay (March 28, 2019) in association with the Confederation of Indian Industry (CII), New Delhi.** *Proceedings:http://www.civil.iitb.ac.in/~dns/CIIIITB.pdf*
   *An MOU was signed between **Environmental Geotechnology Laboratory, Dept. of Civil Engg., IIT Bombay** and **Confederation of Indian Industry, CII, New Delhi**. Through this MOU, this laboratory, which has been established and nurtured by the PI, acquires the status of Laboratory for Geo-Environmental Research & Innovation, **LGeReIn**. It would mainly facilitate (i) identification of the technologies related to disposal/handling and utilization of the industrial by-products and wastes, (ii) undertake environmental impact assessment (based on laboratory and field tests), (iii) providing remedial solutions and (iv) demonstration of the efficacy of corrective measures in the long-run.*

3. In this context, a presentation & follow up discussion between the participants is available @ https://drive.google.com/file/d/1aKw5qSa9l0vvJRwR8xyMjNfrBMO60J-k/view to realize the main agenda. (*please go right away to 44:50th minute of the recording).*

(f) Anticipated outcome

This activity is likely to result in the successful valorisation of various IBPs for effective use in different applications. It can also ensure the commercial viability of the already available technologies or that need to be developed to harness the resource value embedded in the "waste". The "waste", when put to more purposeful and productive sustainable use, would reduce the utilisation of the natural resource.

Creation of a ***Mission mode project*** for IBPs through respective ministries, GOI, to address the critical issues like:

(i) Huge logistics costs for the movement of IBPs from their source to utilization location.

(ii) Lack of promotion and marketing for the suitable usages of the IBPs.

(iii) Lack of awareness of their potential as a resource.

(iv) Move towards a culture of zero net waste by effective reconstruction, reduction and re-use of IBPs.

To join this mission, please visit:
https://docs.google.com/forms/d/e/1FAIpQLSfaQ_4OdBgNVsdOErvGuy5qjCIp_4OUp3zALgVYT_JMvrCRfQ/viewform

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