

## Indian Institute of Metals – Delhi Chapter

### Technical Talk on “Iron & Steel Slags : Characteristics and Utilisation”

A talk on “*Iron & Steel Slags : Characteristics and Utilisation*” was organised at Delhi Chapter on 23 March 2019.

At the outset, Shri B D Jethra, Chairman IIM Delhi Chapter welcomed the Speaker - Mr Rajesh Vijayavergia, Consultant – Steel Research & Technology Mission of India, N.Delhi and others present in the gathering. He gave brief details about the activities of Indian Institute of Metals Delhi Chapter.

Mr. S C Suri, Past President and Incharge Technical Activities in IIM Delhi Chapter, introduced the speaker, as a veteran in RDCIS & Operation Directorates in SAIL and Adviser (R & D) in NMDC. His present assignment is as a Consultant in *Steel Research & Technology Mission of India*.

After introductory reference, the floor was handed over to Mr Vijayavergia.

**Mr. Rajesh Vijayavergia**, during his detailed presentation highlighted different types of slags in iron & steelmaking process, viz. BF, BOF, EAF, IF, Secondary refining, desulfurisation, stainless steel making etc. During early days of steel production in India there was a tendency to dump the slag as a waste product, with the result that huge quantities of accumulated slag is available in Indian steel plants. In addition, with enhanced steel making capacities, the quantity of slag generation has significantly increased, necessitating finding suitable avenues of its gainful utilisation. As a broad indication, ~ 42 million tonnes of slags were produced during 2017-18 (with ~ 67% from blast furnaces only).



Wet granulation of *Blast Furnace slag* commenced in Indian Steel Plants during late 70s and early 80s. Today such plants are an integral part of almost all new blast furnaces as well as rebuilt blast furnaces. Granulated slag, after drying, is the feed material for cement making. However this process requires a significant amount of water for drying purposes. Efforts are required to utilise the sensible heat available in molten slag. Global efforts are also being made to develop dry slag granulation processes

Due to presence of free lime (and its swelling characteristics), safe utilization of *steelmaking slag* has not been established in applications such as a replacement for natural aggregates in road construction, in construction industry, as rail track ballast etc. However usage is being intensively explored in agriculture (for supplementing soil nutrients as well as soil remediation of acidic soil). Owing to extensive usage of fertilisers, top soil in most parts of India is acidic in nature resulting in limited crops production. Steelmaking slag can be used for amending acidic soils for soil neutralization and as a source of growing agents. Significant R & D activities in various academic as well as industrial institutes are being undertaken in this direction.

Significant regulatory inputs too are required for utilization of slags to avoid environmental hazards.

In conclusion, the author opined that

- Blast Furnace slag utilization need to focus on Civil Engg. Applications (cement manufacture, road making, land filling etc.). With plans for enhancing higher cement manufacturing capacity utilization, 100% utilisation of BF slag generated can be easily achieved in future
- BOF steel slag aggregates exhibit a number of favorable mechanical properties. If properly selected, processed, aged and tested, steel slag can be used as granular base for roads
- Volume stability is the key aspect for using steel slag as a construction material. Accelerated ageing of BOF need to be adopted in Indian plants. Studies are required for establishing its usage as aggregates in road construction
- BOF slag may be useful for plant growth, and also useful for acidic soils. R&D programs need be identified and jointly carried out by steel industry and agriculture research institutes for optimum utilization of steel slag in agriculture in India
- Slag generation by EAF and IF based steel making units is close to 3 mt each in the country. Detailed information about their characteristics, quantity generated and stock available need be generated to plan their efficient and economic utilization
- Studies need be initiated for optimum utilization of EAF Steel Slag, IF Steel making Slag, Secondary Steel Making Slag and Desulphurization Slag.



The presentation which was supported by suitable visuals evoked a lively interaction amongst the audience. There were a number of queries during the Presentation

The talk was attended by ~ 20 IIM DC members.

The audience found the programme very interesting and informative.

Chairman, proposed a vote of thanks to Mr. Vijayavergia.

As a token of appreciation, a memento was presented to Mr Vijayavergia by Chairman.

The programme concluded with lunch.



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