

Address on the scope of the seminar

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I deem it a great honour to accept this opportunity to address you this morning on the occasion of the inauguration of the seminar on "Refractories For Reheating & Heat Treatment Furnaces". During the past decade there has been considerable development in the metal processing furnaces to increase greater out-put, quality products and over all efficiency in the furnace operation. The energy consumption in the steel processing units are much lower than the total consumption of the energy in the steel mills but there is greaser possibility of energy saving in this area and the seminar on refractories for reheating and heat treatment furnaces is of great importance at the present energy crisis.

The scope of the seminar includes raw materials, research and development and testing methods, design practice and maintenance, production technology of various refractory materials, service performance fuel efficiency and conservation and latest developments and future prospect. The discussion and exchange of views of the scientists and technologists are expected to focus attention on the different problems and specific conclusion to be reached on the inputs necessary for the present requirement.

The metal forming and heat treatment is an ancient art. The forging process with quenching and tempering was first adopted in the early Brozne age and later on articles are heat treated in different ways and gradual modification and development of an ancient art, shaped into sophisticated technology. The bulk material production requires furnaces and the development continued and to-day the reheating and heat treatment furnaces are highly specialised and efficient equipments for heating the stock to a uniform temperature in a reasonable time with minimum cost without excessive oxidation and other damage to the surface. The main objective of these furnaces are correct heating with good fuel economy and depending on the shape and size of the charge and the numbers of items to be heated, various types of furnaces are in practice e. g. single or multi zone continuous pusher type furnaces, walking beam notched hearth, roller hearths, batch type and electric heated furnaces.

The development of old morgan furnace to multi zone furnace, with decrease of sloping, end discharge system, solid hearth, top fired and reverse firing system minimised the air leakage, greater thickness heating, elimination

of cold spots and air infiltration into soaking zone has increased the productivity but at the same time refractories are subjected to severe condition. Thus the refractories play a key role in the manufacturing of quality products.

The refractories for reheating and heat treatment furnaces are required not only to withstand the higher temperature but also other service conditions i. e. mechanical abrasion at higher temperature, slag and scale attack, temperature fluctuation etc. A wide range of refractories such as firebrick, semi-silica, high alumina, basic and fusion cast bricks, different types of castables, mouldables, plastics and recently ceramic fibres are used in furnace lining. Each type of refractories require to conform the stringent specification and quality control although certain grades of sophisticated refractories are still not sold under any specification or they are not analysed in conventional testing methods. The refractories technologists and scientists are constantly developing suitable processes for evaluating these materials for greater life in operation.

The Indian Refractory Manufacturers should cope up with the demands of the furnace technologists, and improve the conventional refractories to keep pace with the technological advances in other countries. It is essential to focus attention on the need to manufacture special refractories and design for higher performance and lining life.

The conventional bricks and monolithics are to be improved further through constant research and

development, control over selection of raw materials, special bonding agents, and manufacturing techniques. Some refractories of special quality are still being imported due to non availability of technical and engineering know-how. Some of these items are now being started manufacturing in the country, but some are not used at all in our furnaces due to its non-availability. There is an urgent need to develop this type of refractories in the country to meet the furnace designers demand for better performance of furnaces in recent years.

The quality and selection of raw materials play a vital role in the manufacture of better type of refractories. India is fortunate with vast mineral resources including kyanite, sillimanite, and different types of clays etc. To-day the widely used mouldables, castables and plastics are used in different countries in reheating furnaces are normally medium alumina content materials. Good quality base materials are available in the country but certain type of chemical and hydraulic setting bonds are still not available indigenously. Some initiatives should be taken by allied industries to cater the refractory manufacturers with suitable chemical bonds.

The proper furnace design is of prime importance for efficient utilisation of fuel and refractories which play an important role in this regard. In recent years various developments have taken place in abroad. In our country one of

the steel plant achieved a lot of fuel saving by proper designing of the reheating furnaces with indigenous materials and obtained good life by proper maintenance practice.

The production and use of monolithic specially castables, mouldables, and plastics in our furnaces are not so intensive due to non availability of this material in proper quantities in the market. This lacking may be due to non availability of requisite technical know-how and expertise.

Reheating furnaces and soaking pit roofs are one of the vulnerable areas, where various types of indigenous refractories are tried but none of them gave satisfactory life, the same way the recuperator performances are also not satisfactory. The better type of refractories and maintenance practice are required to improve roof life and good jointing cement and refractory tubes are essential for improving performance of recuperators.

In recent energy crisis, conventional lining practice is not adequate for better energy saving and a lot of heat is wasted through the wall. Various types of insulation materials are developed in abroad which play an important role in fuel saving. Unfortunately, these materials are not available but with existing refractories a lot of energy can also be saved.

The use of monolithic, fusion cast refractories and ceramic fibres are major achievements in the recent past. The

use of modular and veneering lining with ceramic fibre are the recent trend and future furnaces may be lined with these refractories to get better fuel economy, out-put and quality products.

As a member of the society, we have chosen the topic which is of importance to this country in the context of energy saving. I understand that over twenty two papers will be presented at the seminar covering a wide spectrum of development, usage, shop floor practice and performance of different types of refractories and they include interesting topics on fusion cast refractories and ceramic fibres which will be a special significant to the furnace designers in place of conventional refractories.

Gentleman, I do not want to take much of your time suffice to say that the papers that will be presented during this seminar will generate stimulating discussion and provide an opportunity for the exchange of technical know-how. More important is that the deliberation and follow up discussion will help to introduce the developments in the steel processing furnaces in the country in near future.

With this, I would like to thank my Organising Committee for giving me the opportunity to address on this occasion.

