GUNNING AND SPRAYING

Fundamental Differences in these two methods of Tundish Wear Lining

There is no dearth of instances of steel plants switching over from one tundish lining system to other depending upon their perceived and actual benefits obtained. But well-documented published data of such experiences, which can be of immense help for others, are either scanty or sparsely available. In our article A Comparative Evaluation of Different Types of Tundish Lining Refractories it has been tried to put together some such experiences made by others and were presented in some recently held different seminars and conferences on Refractories. Here we will try to understand the fundamental differences between Gunning and Spraying, the pros and cons of Gunning vis-à-vis Spraying in tundish wear lining and their root causes.

In case of tundish wear lining whether it has been done by Gunning or Spraying, it is the coating material's performance and its adjustability with the permanent lining which enhances the life of *tundish*. The properties of the coating material that determines the performance are -

>> Optimized packing density for good insulating property to reduce the heat loss through refractory.
>> Controlled shrinkage that helps in easy deskulling and avoid crack formation due to high shrinkage.
>> Reduce the slag infiltration to extend the service life of coating material, etc.

Gunned linings in tundish are said to have been commercially started in Japan to overcome some of the problems of bricked linings. Initially these were alumino-silicate based and later converted to basic type magnesite based to assist with metallurgical practice. Conventional tundish gunning materials are designed to have a low strength between 1000 - 1250^{O}C. This feature assists in formation of a weak zone

between the backup lining and the sintered zone, which in turn facilitates easy deskulling. One of the many disadvantages of tundish gunning material is the shrinkage at high temperature which deteriorates the performance of gunning material. A high shrinkage causes high stress and subsequent crack formations during operation whereas a low shrinkage can be a barrier for easy deskulling. To know more about advantages and disadvantages of different tundish lining materials and practices see our article Trends and Developments in Continuous Casting Tundish Lining Refractory Practices.

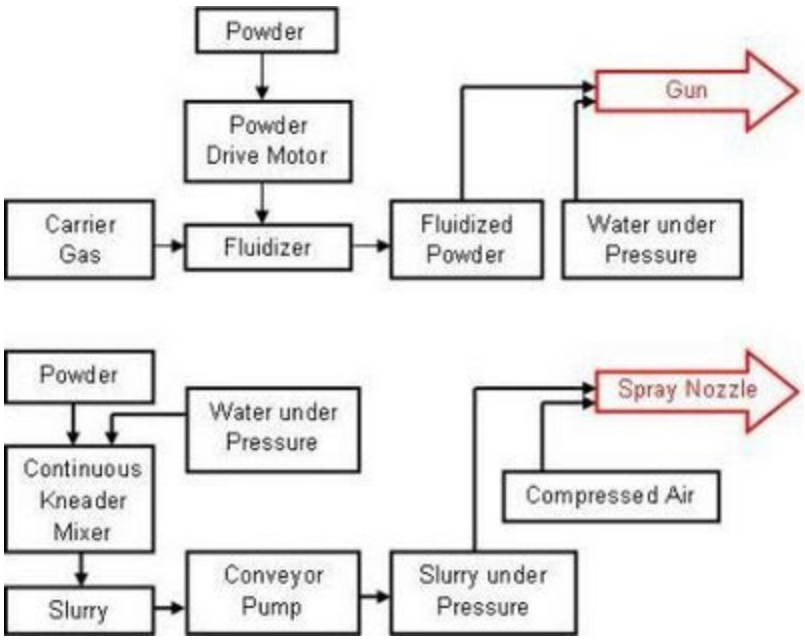
The most commonly faced problems of using a gunning machine or in the process of gunning are -

>> Dust formation during gunning.

>> High rebound losses leading to wastage and high consumption of material.

>> Difficulties in applying variable thickness leading to metal penetration and insufficient permanent refractory lives, and

>> Difficult deskulling.



Whereas when the material is used on a spray gun i.e. through spraying it has the following benefit -

>> No dust formation during application.

>> No rebound loss hence minimal loss of material.

>> The lining thickness was better controllable, thus increasing permanent refractory lives.

>> Deskulling was better.

The root cause of the above can be found in the fundamental differences between **Gunning** and **Spraying** as explained in the adjacent figure. Since homogeneous mixing is possible in spraying (before the product is applied), the incorporation of special chemical additives can help to improve thermal stability properties of the lining and also impart good flexibility.

Source : http://viewforyou.blogspot.in/2009/04/gunning-and-spraying-fundamental.html