

# Steel Rolling Technology Handbook

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Rolling is a metal forming process in which metal stock is passed through a pair of rolls. Rolling is classified according to the temperature of the metal rolled. Steelmaking is the second step in producing steel from iron ore. There are three primary steel making processes; open hearth steel making, oxygen steel making and electric furnace steel making. There are two main raw materials used in making of steel; hot metal which is a molten blast furnace iron and scrap which consists of the byproducts of steel fabrication and also of the worn out, broken, or discarded items containing iron or steel. Open hearth process allows high flexibility in regard to a composition of raw material. The most appealing characteristic of the Open hearth furnace is the rapid production of large quantities of basic steel, used for example to construct high rise buildings. Basic oxygen steelmaking also known as the oxygen converter process is a method of primary steelmaking in which carbon rich molten pig iron is made into steel. Hot metal is the principal material used in the BOS (Basic Oxygen Steelmaking) process. Blowing oxygen through molten pig iron lowers the carbon content of the alloy and changes it into low carbon steel. There are three important types of Electric furnace; A.C (alternating current) direct arc electric furnace, D.C. (direct current) direct arc electric furnace and induction electric furnace. The casting process basically involves pouring molten metal into a mold patterned after the part to be manufactured, allowing cooling and removing the metal from the mold. There are various hot mills involved in the production of steel plate mill, hot strip mill, bar and rod mills etc. Techniques of steelmaking have undergone vast changes in scale and new processes have been developed to meet the demands of speed, quantity and quality. The steel industry has had a long history of development, yet, despite all the time that has passed, it still demonstrates all the signs of longevity. Rapid rise in production has resulted in India becoming the 5th largest producer of steel.

Some of the fundamentals of the book are fusion welding processes, arc welding processes: consumable electrode, arc welding processes, width change by rolling and pressing, metallurgical defects in cast slabs and hot rolled products, primary steel making processes, open hearth steel making, oxygen steel making, electric furnace steel making, chemical formulas of steel making, optimization of primary steel making process, secondary steel making processes, methods of continuous casting of thick slabs, optimization and control of width, fundamentals of metal casting, steel making technology, basic principles of width change, types of mills used for the rolling of plates, quality assurance, testing, and inspection etc.

New ideas continue to revolutionize the steel producing process today as much as they did a hundred years ago. The present book covers latest technology of steel rolling, which will give a new path to entrepreneurs and existing units. It is hoped that this book will be resourceful to researchers, design engineers, technocrats, new entrepreneurs, institutional libraries, training institutes etc.

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