'With proper tech controls, scrap steel can match ore-based quality'

Tata Steel's new steel plant in Ludhiana is being seen as an important development for North India's construction sector," says Harvinder Singh, Professor & Dean (Testing & Consultancy), Guru Nanak Dev Engineering College Ludhiana. He adds, "The plant uses Electric Arc Furnace (EAF) technology, where steel is produced mainly from recycled automobile scrap instead of iron ore used in conventional steel production. This has raised questions among builders and consumers about whether scrap-based steel is safe and durable for buildings. Many people assume that steel made from scrap is weaker or unsafe, but experts say the quality of steel depends more on how scientifically it is processed, refined, tested and controlled during manufacturing rather than the source of raw material itself. If proper technology-driven controls are followed, scrap-based steel can perform as well as ore-based steel."

Harvinder Singh

Explaining the process, he says that traditionally, most steel in India has been produced through the Blast Furnace-Basic Oxygen Furnace route using iron ore and coal. "This produces highly reliable steel with consistent properties and has long been used for bridges, high-rise buildings and major infrastructure projects. However, it consumes large amounts of coal and generates significant carbon emissions," he says.

He adds, "The EAF technology adopted at the Ludhiana plant is more environmentally-friendly. Instead of coal-fired furnaces, electricity is used to melt recycled steel scrap. It also supports recycling of end-of-life vehicles and reduces dependence on mining. Countries such as the USA, Japan and several European nations already use EAF technology extensively."

According to him, experts point out that the real issue is not whether steel comes from iron ore or scrap, but how well the manufacturing process is controlled. Large, organised steel plants carefully sort, analyse and refine scrap before converting it into finished rebars. Advanced sensors, laboratory testing and automated monitoring systems continuously check temperature, chemistry and impurity levels to maintain quality standards. Automobile scrap can in fact be advantageous because its composition is often more controlled than mixed open-market scrap obtained from demolished structures, machinery or unknown sources. If scrap is poorly processed, impurities such as Sulphur, Phosphorus, Copper and Tin may remain in steel and affect weldability, corrosion resistance, ductility and long-term structural performance.

"Engineers also note that modern construction does not judge steel only by strength. Properties such as ductility, fatigue resistance and corrosion resistance are equally important. During earthquakes, reinforcement bars embedded in concrete should bend and absorb energy rather than fail suddenly," says Harvinder.

Email: tcc@gndec.ac.in