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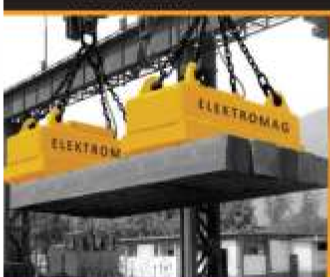

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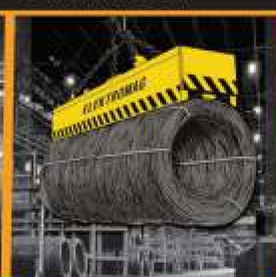

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Sustainable Special Steel Production through Induction Furnace: Empowering India's Automobile & Construction Industries – Key Drivers of Economic Growth

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Introduction:

Steel has long been a cornerstone of the global automobile industry due to its exceptional properties, including high yield strength, durability, and superior modulus of elasticity. Among various metals, steel remains the most preferred material for automotive applications owing to its cost-effectiveness and lightweight potential. The advent of new-generation lightweight, high-strength steels has significantly enhanced fuel efficiency, safety, recyclability, and formability in modern vehicles (Ref. International Journal of Emerging Technology and Advanced Engineering – Application of Steel in the Automotive Industry).

In both domestic and international markets, multiple factors influence steel consumption trends in user industries. Key drivers include globalization, consolidation of steel producers, increased worldwide competition due to deregulation, removal of trade barriers, and the relocation of production units. The intensified competition among global and domestic steel manufacturers is shaping the industry's trajectory.

Steel Production & Environmental Impact:

Industrial activities exert considerable pressure on the environment, with the steel sector being one of the most energy-intensive industries. According to a European Commission study, India's steel industry generates approximately 2.6 tons of CO_2 per ton of finished steel—20-25% higher than China, the world's second-largest emitter. The production of iron and steel requires substantial energy and raw materials, impacting water, land, and air.

In India, steel production is primarily divided into two routes:

- **Primary Route:** 43% (Integrated steel plants using fossil fuels like coal/coke)
- **Secondary Route:** 57% (Electric Arc Furnace - 28%, Induction Furnace - 29%)

Nearly all greenhouse gas emissions in steel manufacturing stem from carbon dioxide produced during energy consumption. Coke production remains one of the major pollution sources. However, secondary steelmaking presents an eco-friendly alternative by utilizing scrap steel, reducing dependency on mining, and mitigating environmental degradation.

Impact of Induction Furnace Steelmaking on the Environment:

As the Indian steel industry transitions toward sustainability, induction furnaces (IF) are emerging as a key player in green steelmaking. With almost negligible CO_2 emissions, low carbon footprints, and efficient energy consumption (600-750 KWH per ton of steel), IF technology is setting benchmarks in eco-friendly steel production. The ability to recycle scrap, coupled with advanced fume extraction systems, significantly minimizes dust emissions and ensures compliance with environmental standards.

Although tightening environmental regulations, such as the Kyoto Protocol, impose challenges on emissions control, induction furnace units face minimal burdens due to their low-emission processes. Nevertheless, in a highly competitive market, IF units must innovate continuously to enhance sustainability and competitiveness.

Driving Forces for Improvement in Induction Furnace Steelmaking:

Induction furnace technology employs precise heating methods to achieve high thermal efficiency. The furnace charge calculation is optimized through simulation modeling, incorporating mass balance analysis and Fe-alloy additions for grade composition. Linear algebraic functions and Visual Basic programming enhance process efficiency, aiding in scrap selection and alloy recovery management.

To maintain competitiveness, IF units must align with industry benchmarks and best practices, focusing on key techno-economic indices. The driving forces for improvement in induction furnace steelmaking include:

- **Optimal Utilization of Raw Materials & Fe-Alloys** for steel grade production
- **Quality Enhancement & Yield Improvement** at all production stages
- **Process & Product Cost Reduction** without compromising quality
- **Reduction in Power & Fuel Consumption** to optimize operational efficiency
- **Innovation in Process & Product Development** for global market entry
- **Development of Value-Added Steel Products** to meet industry demand
- **Manpower Cost Management** for enhanced productivity
- **Strengthening Supply Chain & Marketing Strategies** for better outreach
- **Continuous Quality Monitoring** to ensure customer satisfaction

There is an urgent need to establish IF steel units as high-trust organizations, fostering a work environment that enhances employee well-being and productivity. According to an HBR study, employees in high-trust companies experience **74% less stress, 106% higher energy levels, and a 50% boost in productivity**. Additionally, they take **fewer sick days (13% reduction), demonstrate 76% greater engagement, report 29% higher life satisfaction, and experience 40% less burnout** compared to those in low-trust workplaces. Prioritizing trust-driven leadership and a supportive culture can significantly enhance operational efficiency and workforce morale in IF steel units.

Demand-Based Product Execution & Customer Satisfaction

To remain competitive, steel melting units must align with the evolving demands of key industries, particularly the automotive and construction sectors. By offering customized services, innovative solutions, and value-added products, these units aim to enhance customer satisfaction throughout the purchasing journey. Additionally, many melting units are diversifying their operations to mitigate the cyclicality of the steel industry, ensuring long-term sustainability through continuous product and process development.

Induction Furnace Steelmaking Capacity in India

In India, induction furnace (IF) steelmaking capacity typically ranges between 5 to 20 tons, with some units operating at capacities up to 50 tons. This sector benefits from advantages such as cost-effectiveness, energy efficiency, and flexibility in production. However, the absence of refining units has historically been a challenge, affecting the ability of melt shops to assure customers of consistent steel quality. In response, an increasing number of units are now augmenting their facilities with refining units, gradually overcoming this limitation and strengthening customer confidence in their products.

Value Chain of Induction Furnace Steel Melting

The value chain of induction furnace-based steelmaking in the secondary steel sector involves the production of quality crude steel using sponge iron and scrap through direct reduction (DRI plants). This crude steel is then processed into semi-finished products such as ingots and concast billets/blooms, which are further refined into finished steel products through re-rolling mills and forging units.

India's secondary steel sector is a vast and integral part of the industry, with approximately:

- **333** DRI plants
- **55** Electric Arc Furnaces (EAFs)

- **1,103** Induction Furnaces (IFs)
- **1,313** Steel re-rolling mills
- **600** MSME forging units

These units are distributed across industrial clusters nationwide, forming a robust value chain. The predominance of indigenous IF units in India, compared to imported EAFs, can be attributed to historical industry developments. (*Source: Tata Energy and Resource Institute (TERI) & GIZ - The Deutsche Gesellschaft für Internationale Zusammenarbeit*).

Advancements in Induction Furnace Technology & Its Benefits

The Indian steel industry is witnessing the emergence of integrated mini-mills, supported by government initiatives and R&D efforts. These mini-mills incorporate rolling mills and MSME forging units to ensure the production of high-quality steel that meets modern industry standards.

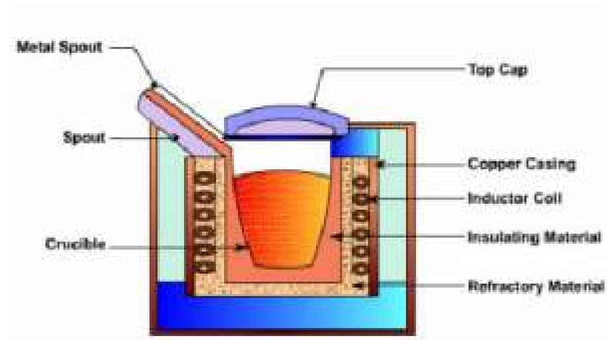
Induction furnaces, classified into medium-frequency and high-frequency types, enable the production of various steel grades, including carbon steel, stainless steel, and alloy steel. Since their introduction in 1981, improvements in raw material quality—particularly recycled scrap—have significantly enhanced the ability of IFs to produce cleaner steel that meets stringent mechanical and chemical properties.

Challenges & Solutions in Refining Induction Furnace Steel

One of the key challenges in induction furnace steelmaking is refining liquid steel within the furnace itself. The acidic lining of IFs prevents the formation of basic slag, making it difficult to reduce sulfur (S) and phosphorus (P) levels to industry-required standards (typically ≤0.025%, and in some cases as low as 0.01% for S).

While some advancements have been made to enable refining within IFs, the process remains time-consuming and costly. The most effective solution, increasingly adopted by steelmakers, is external refining in dedicated vessels. This method improves steel quality, allows the production of advanced steel grades, optimizes the production process, and ensures compliance with the strict requirements of continuous casting for composition, temperature, and purity control.

By embracing these technological advancements, induction furnace-based steelmakers are progressively overcoming their limitations and enhancing their role in India's growing steel industry.



Key Benefits of New-Generation Induction Furnaces

- **Enhanced Melting Efficiency –** Faster melting rates with improved heat transfer and energy utilization.
- **Superior Melt Stirring –** Ensures better homogenization of composition and temperature.
- **Improved Purity –** Facilitates the removal of non-metallic inclusions and floating impurities.
- **Advanced Temperature Control –** Equipped with real-time temperature monitoring and regulation for high precision.
- **Lower Maintenance & Cost Efficiency –** Requires minimal upkeep due to its simple construction and fewer moving parts.
- **Optimized Performance –** Enhances overall process reliability and operational efficiency.

Grade-Wise Steel Production from Induction Furnaces

Indian induction furnace units have successfully evolved to produce a wide range of carbon, alloy, and special steels. These include:

- **Carbon Constructional Steel**
- **Alloy Constructional Steel**
- **High-Strength Low Alloy (HSLA) Steel**
- **Advanced High-Strength Steel (AHSS)**
- **Tool & Die Steel**
- **Ball Bearing Steel**
- **Creep-Resistant Steel**
- **Stainless Steel**

Over the past 25 years, most entrepreneurs have modernized their induction steelmaking units, enabling them to produce high-grade and special steels using advanced induction melting furnaces.

Growing Demand in the Automotive and Agricultural Sectors

- **Automobile Industry**: Over 80% of high-carbon, HSLA, and AHSS steels are used in the automotive sector, which contributes **6% to India's GDP** and **35% to the manufacturing GDP**.
- **Agricultural Machinery & Equipment**: Induction furnace steel supports the manufacturing of **tractors, power tillers, combine harvesters, and other agricultural implements**.

Strategic Placement of Induction Furnace Units

Induction furnace units are strategically located across different zones in India, particularly near major **automobile and manufacturing hubs**. These units operate in either **batch mode** or as **integrated facilities**, ensuring a reliable supply of high-quality steel inputs to **forging and rolling industries**.

This transformation highlights the critical role of Indian induction furnaces in meeting the growing demand for high-quality steel across key industries.

High-Quality Steel Demand by Consuming Sectors

The demand for high-quality steel has surged due to increasingly stringent requirements for steel cleanliness, particularly in the automobile industry. As a result, **secondary metallurgy** has gained significant importance, as it plays a critical role in quality control and refining steel properties to achieve consistent results. A deep understanding of these process steps is essential to meet industry expectations.

Today, nearly all **steel-consuming sectors** demand superior-grade steel to enhance performance, durability, and lifecycle costs of equipment, construction projects, and modern machinery. The steel industry serves a wide range of sectors, including:

- **Construction & Infrastructure** – Structural frameworks, bridges, and high-rise buildings.
- **Engineering & Fabrication** – Precision components and machinery manufacturing.
- **Automotive & Transportation** – High-strength, lightweight steel for vehicle safety and fuel efficiency.
- **Aviation & Defense** – Specialized alloys for aircraft and military applications.
- **Shipbuilding** – Corrosion-resistant steel for marine environments.
- **Energy & Utilities** – Pipelines, power plants, and renewable energy infrastructure.

Being a **core sector**, steel plays a crucial role in India's manufacturing output and economic growth, serving as the backbone of national development. Globally, steel is valued for its **strength, versatility, and durability**, making it indispensable across industries.

Steel Consumption Trends in the Automotive Industry

The **automobile industry** is the second-largest consumer of steel after construction and infrastructure. It accounts for **12% of global steel consumption**, with regional variations:

- **European Union** – 17%
- **United States** – 26%
- **India** – Approximately **40%**

Modern automobile manufacturers increasingly prefer **high-quality special steels** due to their superior strength, durability, and safety advantages at competitive costs compared to alternative materials. Given this trend, **Indian induction steel**, when refined for quality and enhanced properties, has the potential to cater to critical machinery parts and high-grade steel applications.

A thorough market analysis should be conducted by marketing teams and steel product suppliers to identify opportunities and expand market share in these high-value segments.

Refining Liquid Steel: The Shift Towards Clean and High-Quality Steel

In today's market, steel consumers demand **refined and high-purity steel** as a standard requirement. This shift is driven by evolving customer expectations, stringent quality standards, and the increasing need for **sustainable and clean steel production**.

Challenges Faced by Indian Steel Producers

Indian steel manufacturers, particularly those using **induction furnaces**, struggle to compete with **Chinese producers** due to:

- **Economies of scale** achieved over decades.

- **Heavy subsidies** provided by the Chinese government.
- **Advanced automation, robotics, and R&D investments** in Chinese steel plants.
- **Global reports** highlighting concerns over substandard steel quality and low-cost products flooding the market.

As a result, Indian steelmakers must **tighten refining processes** to meet customer expectations, as modern buyers consider **only clean or ultra-clean steel** acceptable for use.

The Growing Role of Ladle Refining Furnace (LRF) in Steelmaking

To meet stringent quality norms, **Ladle Refining Furnaces (LRFs)** have gained prominence among steel producers, especially for **construction-grade steel** used in large-scale **infrastructure projects, ports, bridges, dams, and high-rise buildings**.

LRF Process: Enhancing Steel Purity and Properties

After being tapped from an **Induction Furnace (IF)**, molten steel is transferred to the **Ladle Refining Furnace (LRF)** for further refining. The key objectives of LRF processing include:

1. **Chemical Composition Adjustment** – Precise alloying and inclusion modification.
2. **Deoxidation & Inclusion Removal** – Eliminating oxygen and non-metallic inclusions.
3. **Homogenization** – Uniformity in chemical composition and temperature.
4. **Hydrogen & Nitrogen Reduction** – Minimizing gas content for improved steel quality.
5. **Sulphur Removal** – Achieving ultra-low sulphur concentrations (<0.002%).
6. **Carbon Control** – Adjusting carbon levels to meet grade-specific requirements.
7. **Improved Mechanical Properties** – Enhancing toughness, ductility, and transverse properties.
8. **Increased Productivity** – Faster emptying of the melting furnace, optimizing operational efficiency.
9. **Lower Ferro-Alloy Consumption** – Cost savings through optimized refining.

Key Advantages of LRF Technology

- **Micro-alloying** for enhanced mechanical strength.
- **Deep desulfurization** (<0.005% sulphur levels).
- **Superior purity** through inclusion removal and floatation.
- **Extended holding time** for vacuum degassing under **1 mbar pressure**.
- **Tramp Element Removal** – Eliminating trace impurities like **Sn (Tin), As (Arsenic), Zn (Zinc), Bi (Bismuth)**.
- **Refining of scrap-based steel** to high-quality standards, regardless of the furnace type (Induction or Arc).

The Future of Clean Steel Production

Globally, **Electric Arc Furnace (EAF) mini-mills** are leading the transition towards **cost-efficient, flexible, and sustainable steel production**. With nearly **200 EAF-based plants operational in North America**, this model is proving successful due to:

- **Lower resource consumption** and operating costs.
- **Flexible production** to match fluctuating market demand.
- **Sustainability benefits** by integrating scrap recycling and clean energy sources.

For Indian steelmakers to remain competitive, investments in **secondary refining technologies like LRFs** will be critical. Upgrading refining capabilities will enable domestic producers to **deliver high-quality, clean steel** that meets global benchmarks while catering to the needs of industries such as **automotive, construction, infrastructure, and heavy engineering**.

Refining Liquid Steel by Vacuum Degassing

The demand for high-quality steel products continues to grow with the advent of more stringent requirements for steel cleanliness. As a result, secondary metallurgy has become increasingly important, particularly in controlling and treating liquid steel to remove undesired dissolved gases such as hydrogen and nitrogen. Additionally, secondary refining processes help reduce the density of harmful inclusions in steel.

In the production of seamless tubes, pipes, and highly critical forged products, Vacuum Degassing (VD) plays a crucial role. It ensures ultra-clean steel by significantly decreasing micro-inclusion density during vacuum treatment while modifying the inclusions' composition from solid spinel's to partially liquid calcium aluminates. However, the density of larger inclusions tends to increase during the process, which is influenced by the stirring energy applied. Therefore, proper control of stirring conditions during vacuum treatment is essential to achieving the desired steel cleanliness.

Role of Vacuum Degasser (VD) in Steel Refining

A Vacuum Degasser (VD) facilitates the degassing and decarburization of molten steel, providing optimal conditions for desulfurization and inclusion removal. During the VD treatment, the liquid steel ladle is placed in a vacuum tank, which can be either stationary or movable depending on layout requirements. While VD does not eliminate solid impurities, it effectively removes most gaseous impurities, reducing oxygen levels to about 25 ppm or lower and hydrogen levels to less than 2 ppm. Sulphur content is also significantly reduced during this process.

Objectives of Refining Outside the Furnace

Refining outside the furnace serves several key purposes, including deep decarburization, desulfurization, deoxidation, degassing, composition adjustment, microalloying, temperature homogenization, and inclusion removal. This process also modifies the morphology and composition of inclusions. The refining process ensures compliance with high-quality steel standards through the following aspects:

1. **Precise Chemical Composition Control** – Ensures stable mechanical properties.
2. **Reduction of Phosphorus and Sulphur Content** – Improves impact performance, lamellar crack resistance, and hot brittleness while preventing center segregation and surface defects in billets, especially those produced via continuous casting.
3. **Reduction of Oxygen, Hydrogen, and Nitrogen Content** – Minimizes ultrasonic flaw detection defects, strip cracks, and enhances pipe-making performance.
4. **Advanced Refining Technologies** – Controls sulphide inclusions to prevent hydrogen-induced cracks.
5. **Improved Inclusion Shape Control** – Enhances deep drawing and processing performance of steel.

Implementation of Secondary Refining in Induction Furnace Steelmaking

Entrepreneurs operating induction furnaces for steelmaking are increasingly integrating secondary refining units like Ladle Refining Furnaces (LRF) and VD systems, either matching their existing furnace capacity or enhancing their capabilities to produce cleaner steel and meet evolving customer requirements.

In modern steel production, induction furnace steelmaking is a crucial method for producing large quantities of alloy and special steels. The primary raw materials for induction furnaces include steel scrap, sponge iron, and cast iron. India relies heavily on sponge iron, contributing significantly to its annual crude steel production. The proportion of sponge iron in the charge mix varies from 0% to

90%, depending on the steel grade, availability, and production economics.

While induction furnace steelmaking is widely used for plain carbon and construction-grade steels, phosphorus control remains a key challenge, especially when using sponge iron. Without a refining facility, phosphorus levels in steel can reach between 0.045% and 0.09%, while sulphur remains around 0.040%. These levels are unacceptable for most customers except for TMT or construction bars, a segment that is also gradually demanding higher quality. To address these concerns, steelmakers are adopting various ladle refining techniques for dephosphorization and desulfurization.

Ladle Refining Furnace (LRF) and Secondary Refining

The Ladle Refining Furnace (LRF) is a secondary refining unit typically used after the primary melting process. Its main functions include:

- Removal of sulphur and impurities from molten steel.
- Chemical composition adjustments.
- Improvement of high-quality carbon, alloy, stainless, and manganese steels.
- Enhancement of overall steel quality.

Vacuum Degassing (VD) and Inclusion Control

Vacuum Degassing (VD) is critical for removing dissolved gases such as hydrogen and nitrogen while reducing harmful inclusion density in steel. A key focus of VD is to evaluate its impact on inclusions, particularly in steels used for seamless pipe production. To achieve this, a systematic analysis of steel samples before and after vacuum treatment is conducted using an automatic particle analyser coupled with Scanning Electron Microscopy (SEM) and Energy Dispersive Spectroscopy (EDS), a non-destructive analytical technique.

Several mini steel plants, in collaboration with laboratories, assess steel quality through test results. These results quantify the number, size distribution, and chemical composition of inclusions over a large specimen area. The findings indicate that micro-inclusion density significantly decreases during vacuum treatment, and inclusion composition shifts from solid spinel's to partially liquid calcium aluminates. However, larger inclusions tend to become denser during the process, a phenomenon linked to stirring energy levels during treatment.

To evaluate the impact of VD on steel quality, an inverse desulfurization model is used to estimate the mass transfer coefficient required for the observed desulfurization rate. This analysis highlights that precise control of stirring conditions during vacuum treatment is essential to achieving optimal steel cleanliness and quality results.

Challenges in Producing Special and Critical Grades by the Induction Furnace (IF) Industry

The induction furnace (IF) industry plays a crucial role in producing major grade groups of steel. However, due to the absence of in-house processing units in many plants, value-added products in critical grades are often manufactured in collaboration with nearby units.

India's steel exports primarily consist of value-added steel products with higher profit margins. To maintain global competitiveness, it is essential to increase the share of high-value and technologically advanced steel in exports. Many Indian IF units possess the capability to produce precise steel grades, with some units directly integrated with hot and cold working operations.

IF units have a deep understanding of steel grading characteristics, the impact of alloying and harmful elements, and the property requirements of final products. However, a key challenge lies in aligning steel production with the needs of end-user industries. China has made significant progress in this regard by systematically gathering data on end users and securing orders based on specific requirements. In contrast, Indian steelmakers largely rely on dealership networks for marketing, an area that requires strengthening to achieve a more demand-driven approach, similar to the Chinese model.

With the rising demand for critical-grade steel and government support for special steel production, Indian manufacturers face increasing pressure to match the quality and properties of steel from developed nations. The global steel industry continues to evolve, with constant upgrades in technology and processes. With over 1,500 high-grade steel variants available worldwide, there is immense potential for growth to meet the diverse needs of modern infrastructure and industrial development.

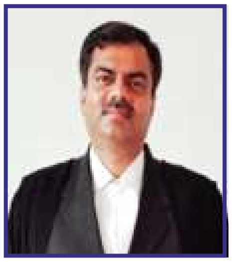
High-strength, low-alloy (HSLA) steels with low to medium carbon content are widely used in manufacturing and fabrication industries. IF units have expertise in producing these grades, but a strategic approach is needed to tap into opportunities for import substitution. A targeted survey and assessment of the demand for high-strength, ductile steel components in machinery and engineering applications can help Indian IF manufacturers compete more effectively in the global market.

Conclusion

Induction furnace (IF) steelmaking relies on the induction electro-thermal effect to heat scrap and convert it into liquid steel. IF units have developed significant expertise in producing high-quality steel and alloy steel. However, the process is highly energy-intensive, relying solely on electric power. Despite the absence of in-furnace refining facilities and inherent inefficiencies in traditional melting processes, IF units continuously strive to optimize power consumption and enhance productivity.

A key limitation of induction furnace steelmaking is the lack of refining capability due to the use of acidic lining. To achieve the required steel cleanliness and meet customer specifications, refining must be conducted externally in ladles using secondary metallurgical processes such as Ladle Refining Furnace (LRF), Vacuum Degassing (VD), and Argon Oxygen Decarburization (AOD).

Induction furnaces are widely utilized in foundries for melting cast iron, mild steel, and various alloy steels, as well as in mini steel plants for steel production using sponge iron. The furnace lining plays a crucial role in its performance, directly impacting efficiency, output, and metallurgical control. A well-laid and stabilized lining ensures smooth furnace operation, enhances productivity, and facilitates better control over the refining and metallurgical processes, ultimately improving steel quality.



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Why melting scrap should be subjected to 0.1% GST on the lines of 0.1% GST on supplies made to merchant exporters under IGST Notification 41/2017 to increase government revenue, stop ITC fraud and save the bonafide manufacturing industry.

1. Secondary steel manufa-cturers are under imme-nse pressure due to ongoing investigations into input tax credit (ITC) fraud, despite most of them being innocent. Many face penalties and arrests due to the fraudulent practices of their scrap suppliers. ITC fraud in the steel sector has become widespread, with professional intermediaries using fake firms to claim and pass on ITC through bogus invoices.
2. It is impossible to track revenue leakage through human surveillance, and the ITC fraud cases being booked in the country are just the tip of the iceberg. Further, whatever cases are booked, most of the evasion noticed remains unpaid to the government. The cases being booked in the sector are not even 5% of the revenue leakage. Further, the extent of evasion that this sector has been witnessing is a reason for the corrupt nexus between the unscrupulous elements and tax authorities.
3. Therefore, ITC fraud cases in the steel sector needs to be addressed scientifically in such a way that the root cause of ITC fraud gets eliminated, the tax collection by the government ramps up, and bonafide manufacturers are not tortured at the hands of tax authorities. This article highlights the root cause of the problem, the stress faced by employment generating secondary steel sector and has proposed a scientific solution to increase government revenue. The solution suggested will reduce pressure on investigating agencies, apart from reducing corruption in the government sector.

The basic reason for ITC fraud by traders

4. Melting scrap is generated in various households and other places where the seller is not required to pay any GST. This scrap is purchased by small-time Kabadi, who are all unregistered under GST. These kabadis sell the scrap to a larger trader, say LT. LT, who purchases the scrap from kabadis, his turnover is definitely more than 40 lacs in a year, and therefore, he is exigible to GST.
5. The current GST rate on this scrap is 18 %. Now, this trader LT, has to discharge his entire tax liability from cash ledger as there is no credit available to him. Thus, this 18% tax liability gives him reason and lures him to resort to fraudulent practices, where he arranges fraudulent credit to save this 18%. They are all arranging invoices from those dealers/retailers of consumer items, whose buyers are neither interested in credit nor a proper bill.
6. For example, when medicines or a television or air-conditioner is sold to customer, customer is going to consume the product and therefore he is not going to claim any credit. Further, for these over-the-counter purchases, the consumer is not interested in a proper bill. So, LT gets the bill from the medicine supplier, claims credit in his credit ledger and discharges his tax liability on scrap using fraudulent credit

claimed on dummy purchase of medicines. Very scrutiny of purchase and sale invoices of LT itself makes it clear that some fraud is going on, because medicine and television cannot be converted into a melting scrap and that too by a trader. Now, these fraudsters have started doing layering also to give it the colour of a genuine transaction at the level of LT and downwards. They create dummy entities P and Q. Now P arranges all the fraudulent bills of medicines and issues scrap invoices to Q. P and Q just exist on paper, do not do any activity except arranging dummy purchase invoice, issuing sell invoice and filing returns. Q claims credit on the purchase of scrap invoice and issues scrap invoice to LT. Thus, from a distance, just looking at Q purchase and sales invoice in isolation, no wrong can be detected. LT claims credit on the dummy purchase of scrap invoice from Q and claims credit and utilises it towards his actual supply of scrap to manufacturers, which he actually procured not from Q but rather from various unregistered kabadis. At times, some extra layer is created between LT and the manufacturer also. In the process, this fraudulent credit of 18% of scrap value is injected in the credit chain and thus ultimately reduces the cash revenue of the government to that extent.

7. The uniqueness of the commodity, on the one hand, leads to loss of legitimate revenue and on other hand it becomes a source of rampant corruption in the tax department coupled with torture and harassment of manufacturing units for all wrong reasons.

The current 18% GST on scrap is leading to loss of revenue to the Government and choking the secondary Steel manufacturing industry

8. On an average, every secondary Steel manufacturer pays 20 to 40% of his total liability by making a debit in the cash ledger and remaining by making a debit in the electronic credit ledger. For secondary steel manufacturers, more than two-thirds of the credit is earned through the purchase of scrap and one-third through the purchase of sponge iron. Thus, the primary source of credit in the electronic credit ledger is scrap supplied by traders who are all in the unorganised sector. Therefore, a large chunk of government revenue is dependent on good behaviour of unscrupulous scrap traders, who are mostly in unorganised sector and that is why it is prone to evasion and ITC fraud. If the source of this credit is eliminated without causing any loss to government revenue, the possibility of evasion of government taxes will automatically get reduced.

9. Today because liability to pay is casted on the supplier, who are all in the unorganised sector and who are resorting to various fraudulent practices and running away, creating a lot of trouble for manufacturing units. Secondary Steel manufacturing units are under tremendous pressure. When the investigating teams visit, they do not look at the problem in a holistic way and for them the ineligible credit has been injected into the credit Chain and it has reached to manufacturing unit and therefore they are resorting to all investigation tactics such as search, summon and arrest and coercing manufacturing units to pay the tax which is never due from them. This is killing the vibrant secondary Steel manufacturing industry.

10. The business entities all over India are perturbed with the high handedness of GST authorities with respect to investigation termed as “fake ITC”. The officers are not differentiating between wrongdoers and honest taxpayers and in the process, arm-twisting the business entity which has got permanent establishment and who creates employment in the country. The investigations

being done under constant threat of arrest with abusive procedures is killing the golden goose which pays the tax and creates employment and is retarding the economy.

The Core Issue to be Addressed

11. The Core issue at hand is

    a. Blatant violation of ITC by traders of scrap, who do not have a permanent establishment and who are mostly in the unorganised sector and resultant loss of govt revenue because fraudulently availed credit enters in the credit chain.

    b. The stress being faced by manufacturing units, who have permanent establishment and who cannot run away and who are actually eligible for credit as they have actually received the goods along with invoice and supplier has filed GSTR 1 and GSTR 3B. Manufacturers have also discharged output tax liability on manufactured goods corresponding to inputs received. Their output supply is not disputed by the department. Since traders run away and manufacturers with fixed establishments cannot run away, revenue authorities are chasing manufacturers and trying to penalise them for the malpractices of traders. This is killing the manufacturing sector, which creates huge employment.

Is RCM a solution? The RCM introduced vide Notification No. 25/2024 is not effective at all

12. Charging GST on a reverse charge basis cannot be an optimum solution because of the presence of multiple traders/intermediaries in the supply chain of melting scrap. Vide notification no. 50/2018- Central Tax, dated 13th September, 2018 as amended by Notification No. 25/2024-Central Tax Dated: 9th October, 2024 has introduced reverse charge, when a supply is made by an unregistered supplier of scrap to a registered person. Further, it says that the moment an unregistered supplier crosses the threshold of 40 lakhs turnover, he has to get registered, and thus he will automatically discharge his GST liability on a forward charge basis. In this scenario, manufacturing units cannot procure more than one percent of their requirement from an unregistered supplier, as supplies made in a day itself will cross 40 lakhs turnover. Therefore, manufacturing units have to depend on registered suppliers of melting scrap who will continue to charge GST on a forward charge basis. If at all, an RCM is to be introduced, that can be done by exempting supply of melting scrap to a trader (other than manufacturer), who supplies the melting scrap as it is to other registered persons. In this case, if a reverse charge is created on purchases made by manufacturers, then the entire GST liability on scrap shall be discharged by manufacturing units. But this is not an optimal solution because this will keep all traders and their supplier-related data out of the system. This may also encourage the purchase of scrap by manufacturing units in cash out of books because they have to dodge the system just at their end.

The Proposed Solution: Reduce GST on Scrap to 0.1%

13. The root cause of ITC fraud is the high rate of GST, which incentivizes fraudulent transactions. By reducing the GST rate on melting scrap supplied by traders to 0.1%, the motivation and sharable amount for fraud is eliminated. This minimal tax rate removes the incentive for arranging fake invoices for credit while ensuring full transaction traceability within the GST system. Arranging fake invoices for credit to discharge 0.1 % GST shall be unviable for fraudsters also.

14. If we reduce the GST rate on the melting scrap supplied by traders from GST, then there will be no loss to the government at all, because the melting scrap is not an item of consumption by an individual, rather an industrial input and thus whatever tax is genuinely paid on scrap is eligible for credit. It should be noted that any tax which is paid, where the recipient claims credit, there is no tax collection by government in real sense. The government collects tax in real sense if and only if GST is paid and no credit is claimed by the buyer. Therefore, reducing the GST rate on melting scrap will actually lead to higher cash payment of tax by manufacturing units.

15. With 0.1 % GST rate, the probability of fraudulent injection of ITC gets reduced as sharable amount becomes so low that it will be no more lucrative on one hand, and on the other hand entire chain of transaction shall be captured by GSTN because of filing of return by traders to have better traceability of transactions.

16. Once the GST rate is reduced on melting scrap, there is nothing that remains to be shareable amongst the various scrupulous traders, and therefore, the ITC fraud will cease to exist. Today, whatever fraudulent ITC is being injected by traders, to that extent, it actually reduces the cash collection of the government. Once injection of fraudulent credit in the system is stopped, government revenue will increase.

17. The 0.1 % GST on melting scrap, effectively acts as an RCM, where traders are effectively freed from the tax burden beyond 0.1 %, and entire tax liability in the value chain upto billet/TMT is to be discharged by manufacturers, at the same time entire transaction of traders is captured by the system.

Who should be given greater responsibility to pay tax in the value chain

18. As a tax policy measure, in the value chain, the persons with fixed establishment, who cannot run and who have better credibility, should be given greater responsibility to pay the tax. At present, when GST rate is 18% on melting scrap, upto the level of value-added product like Billets/TMT more than 2/3rd of tax is to be paid by scrap traders who do not have permanent establishment, who can establish overnight and who can run away overnight, and less than 1/3rd tax liability is to be paid by manufacturing units having permanent establishment who cannot run away. In case of evasion, the moment investigation starts, traders disappear and entire heat of investigation is directed towards manufacturers who cannot run away. 0.1 % GST on melting scrap will ensure that almost the entire tax burden upto TMT/Billets is discharged by manufacturing units, who has got fixed establishment, who cannot run away and who can be made accountable during the investigation.

Similar Precedent Exists: Government has introduced 0.1 % GST on supplies made to merchant exporter

19. The government has already reduced the GST rate to 0.1% on supplies made to merchant exporters for all commodities irrespective of their neutral rate vide Notification No 41/2017 Integrated Tax (Rate) dated 23rd October, 2017 and corresponding CGST/SGST notifications subject to their traceability and incorporation in exports made out of India. This has been done so that the funds of Merchant Exporter are not blocked towards GST, and they are not financially stressed.

Addressing Concerns About Revenue Loss

20. Tax authorities often argue that the reduction of the GST rate on melting scrap will lead to a loss of revenue on imported scrap or melting scrap generated by other manufacturing units, which is close to 20,000 Crores per annum. It should be noted that the entire GST paid on imported scrap as well as scrap generated by other manufacturing units is creditable, the supply chain is traceable and their recycle time is of a few weeks and thus, there shall not be actual loss of revenue. It will be simply a case of deferred collection of revenue at the end of manufacturing units, which gets postponed by a maximum of a month. The manufacturing units shall pay lesser GST on imported scrap, shall claim lesser credit and shall be paying higher GST in cash on their supplies post conversion of scrap into finished product.

Conclusion

21. To curb ITC fraud, prevent revenue leakage, and support the secondary steel industry, it is imperative to reduce GST on melting scrap to 0.1% for achieving the following objectives.

   a. Elimination of ITC Fraud: With negligible GST liability, traders have no incentive to arrange fake invoices for credit, thereby preventing fraudulent ITC claims.

   b. Shifting tax collection to manufacturers with fixed establishment: The 0.1 % GST on melting scrap, effectively acts as an RCM, where effectively traders are freed from tax burden beyond 0.1 % and entire tax liability in the value chain upto billet/TMT is to be discharged by manufacturers, at the same time entire transaction of traders is captured by the system.

   c. Preventing Loss of revenue: The entire tax on melting scrap being creditable, there shall be no loss to revenue on account of this rate reduction. It should be noted that any tax which is paid, where the recipient claims credit, there is no tax collection by government in real sense. The government collects tax in real sense if and only if GST is paid and no credit is claimed by the buyer.

   d. Ensuring Higher Revenue Collection: Manufacturing units will pay a higher proportion of GST in cash, and with elimination of injection of fake credit in the system, actual tax collection shall go up.

   e. Protecting Genuine Manufacturers: Manufacturers will no longer face arbitrary investigations and penalties due to fraudulent practices by traders.

   f. Improving Compliance: A lower GST rate will encourage traders to register and report transactions accurately, enhancing transparency.

Reducing corruption: More violations of law lead to more corruption, and fewer violations and better compliance will reduce corruption in the system.

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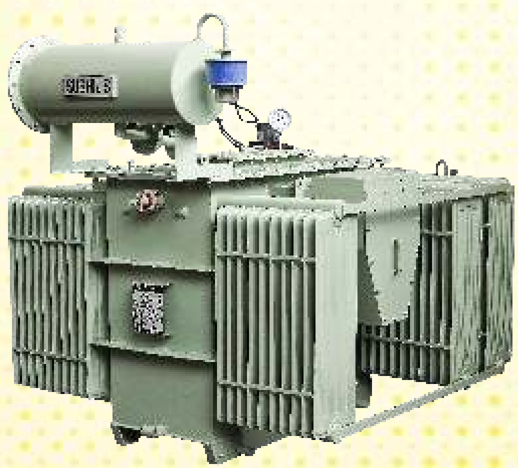

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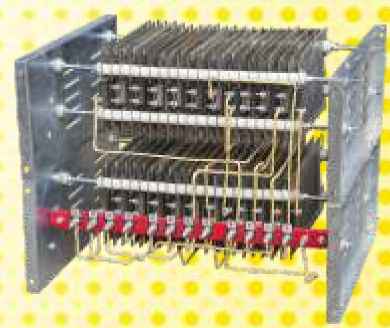

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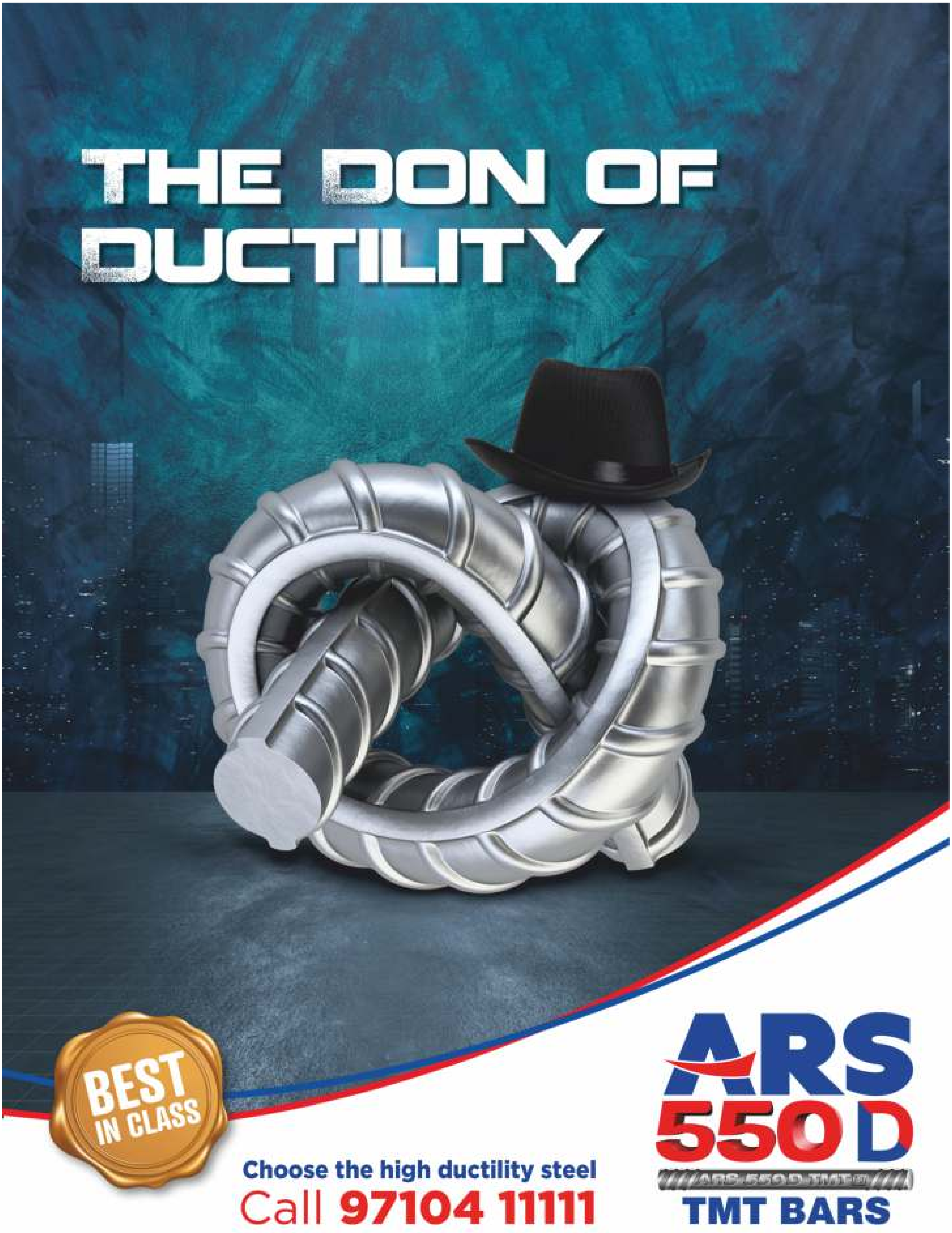
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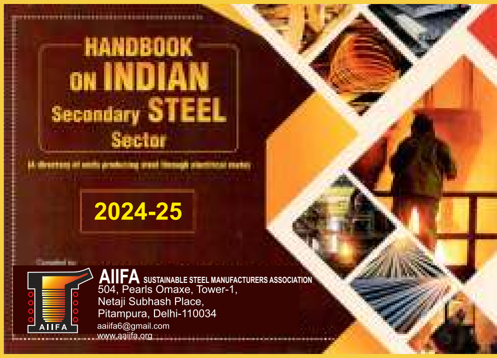

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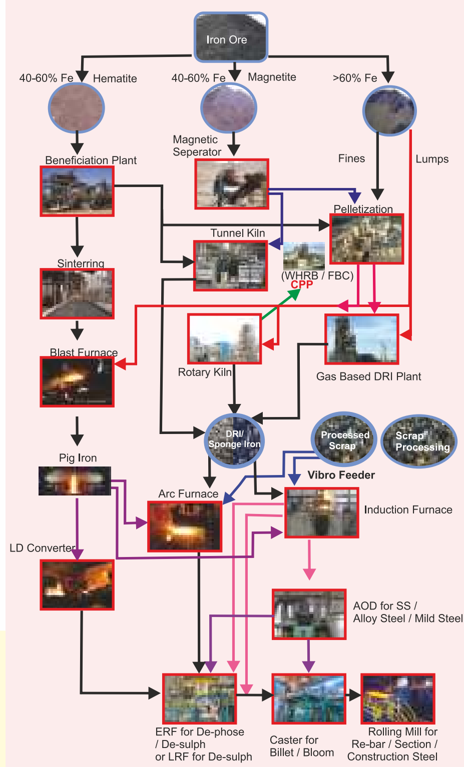

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