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Building Sustainable Mini Cold Rolling Complexes

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INTRODUCTION

Lot of emphasis has been laid on large steel complexes with varying degree of complexity. However, it has been noticed that Cold Rolling Complexes have a sustained business model owing to their flexibility and proximity to the end user of final product. To augment our case we present two scenarios. One, wherein we had partnered with an entrepreneur located in National Capital Region (NCR) of Delhi. This company has expanded in a staged manner with limited financial resources and has a solid grip over a particular market segment dealing primarily with domestic use of flat steel. Buoyed by this successful partnership for a decade, we have built another case study which is more economical in financial terms and could be more beneficial for future entrepreneur and steppingstone for larger investments.

BACKGROUND

On 24th December 2012, Director Gaurang Products Pvt Limited l(GPPL) located in Ghaziabad city (NCR Delhi) approached Yogiji Digi with a perennial problem he had with his plant and its product mix. The product of his existing plant which were essentially tubes and sections and partly flat steel production but the plant had run in heavy head winds and not performing as anticipated.

Deep diving into future of the plant and its sustainability, we started discussing possible market demand and product mix.

While discussing the future possibilities it was also to be taken in account that boundary area of the plant premises was fixed with no scope of further land acquisition. This was due to the fact that the plant location was in heart of urban dwelling. The total area available was 100,000 square meters. This further made us to think innovative technologies which could be acceptable to the municipal authorities such as effluent generation, community health and safety etc.

Due to the past mis calculated decisions, the company was facing a GO/NO GO situation for revamping or expansion or a need to change. Due deliberation on various possibilities and our assurance of continuous support in all aspect regarding operations GPPL decided to GO ahead but with limited project budget. We supported the vision with our innovative green technologies and using whatever that could be salvaged from the existing facilities.

As a starting point we along with the end customer streamlined the product mix. It was decided to essentially focus on Flat Steel end products ensuring sustainable market and a healthy revenue stream.

CASE STUDY #1: EXISTING FACILITY AT NCR DELHI

The existing set up prior to revamp was as follows:

1. Push Pull Pickling Line (2 Tanks) of 5,000 Tons per month capacity
2. Narrow Cold Rolling Mill of 1000 mm width producing 600-1000 Tons per month
3. Open Annealing facility of 1000 Tons per month capacity.
4. 2 Hi Skin Pass Mill which was not operational.

See Figure 1.

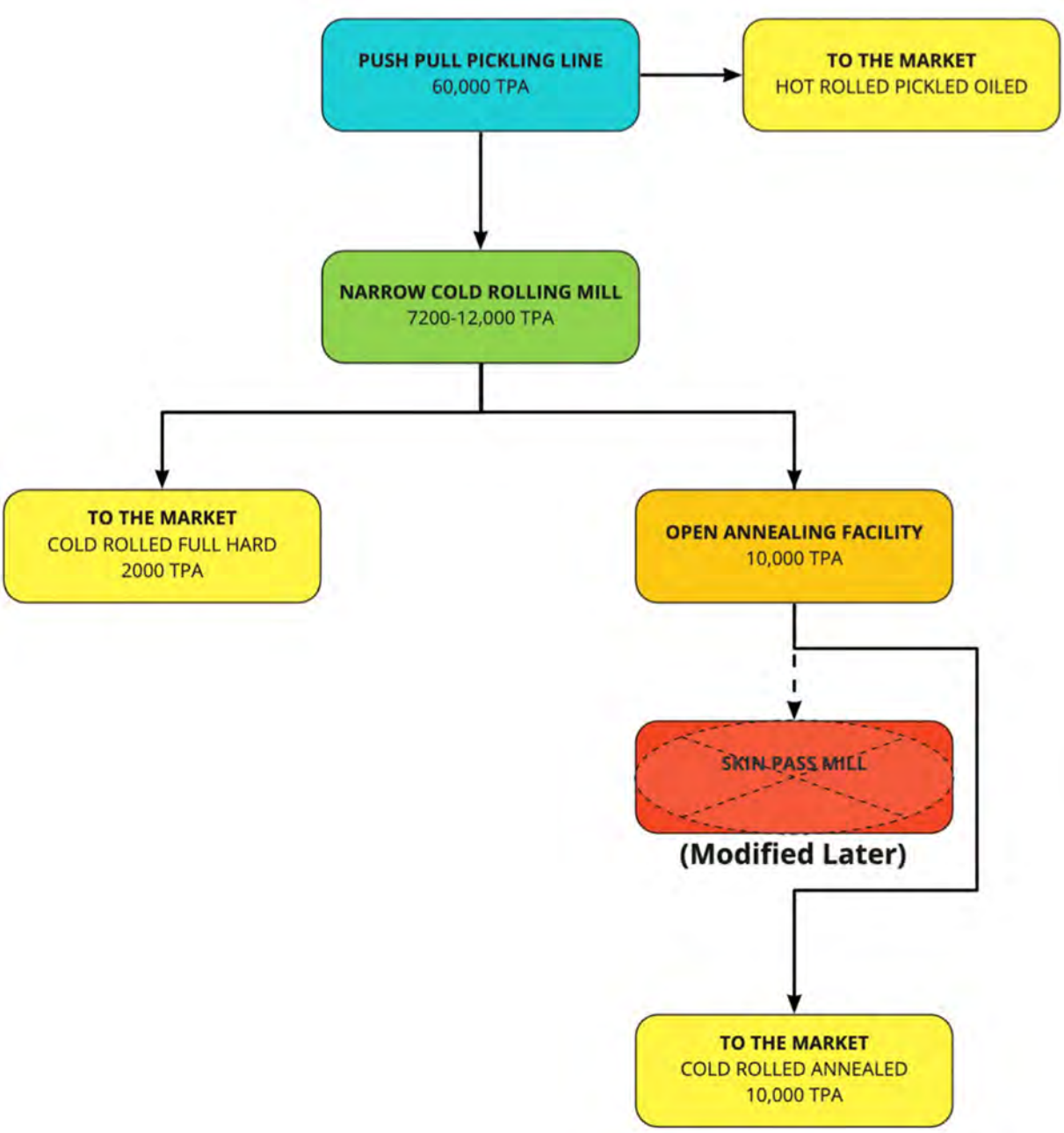

Figure 1. Initial Facility Flow Diagram.

It was decided to overhaul the facility by installing Yogiji Digi 4 Hi 1250 mm Green Cold Rolling Mill. The mill installed is energy efficient and saves water. Both being desirable inputs for operation of mill and meeting the end goals. This mill could produce 5000 Tons per month.

This was followed by setting up another 4 Hi 1000 mm Green Cold Rolling Mill capable of producing another 5000 Tons per month of cold rolled coils. The decision to set up a 1000 mm wide mill was taken targeted at specific market segment.

Apart from the Green Technologies used in Cold Rolling Mill, electrics and mill bearing were made common for both mills ensuring substantial savings on spares inventory.

Installation of two new mills led to shortage of Pickled coils. This led to a decision of scrapping the old Pickling Line and install a modern 2 tank line capable to produce at least 10,000 Tons per month. At this juncture we worked on the existing layout by modifying and relocating various operational unit to ensure better and smoother material flow. The Pickling Line was fitted with all modern features.

It needs to be pointed out that with all changes brought about, the end products from the unit were well accepted and appreciated by the consumers and the company turned green once again. This brought about confidence in the investors, and they were now wanting to expand their market share. Focus once again shifted to enhancing product mix.

The open Annealing facilities were augmented (done by others) by doubling the existing facilities to 2000 Tons per month. While this done, we partnered with plant management to produce unique end product- Blackened Annealed sheets traditional used for production of Steel Almirahs/ Closets and storage boxes. These are very popular in areas in and around NCR Delhi. The cold rolled black annealed sheets cut to standard sizes and sold as packets. Thanks to the efficient product from New Cold Rolling Mills and Cut to Length (CTL) lines led to better yield and this became the conner stone of back to profitability of the plant.

Focusing on qualitive aspects of the end product, it was decided to install a 4 Hi Skin Pass Mill and a Tension Leveller. This ensures final product is of better surface finish and ensures flexibility during forming operation/fabrication. GPPL soon became an acceptable and formidable supplier.

Gaining confidence and growing partnership with Yogiji Digi led to increasing the basket of product mix by installing a NOF Continuous Galvanizing Line of 8 TPH capacity, adding about 50,000 TPA of Galvanized coils to the product mix. The machines for surface finish and formability like Skin Pass Mill and Tension Leveller were already installed.

Quality output from the plant ensured better traction/ feedback from the market and the company then decided to enhance the Galvanizing Line (CGL) to 18 TPH which will take the capacity of GI coils to about 120,000 TPA.

The enhanced capacity expected from CGL and existing demand of Blackened Annealed Sheets meant shortage of Cold Rolled Coils. We are undertaking the upgradation of existing Rolling Mill by increasing the Mill speed which will ensure requisite capacity to meet the demand of the CGL and annealing furnace.

Further increasing the product mix, Digi Drive is executing a Color Coating Line of 13 TPH capacity enabling GPPL to have 80,000 TPA of color coated coils/sheets – new addition to the growing basket of product offering.

See Figure 2.

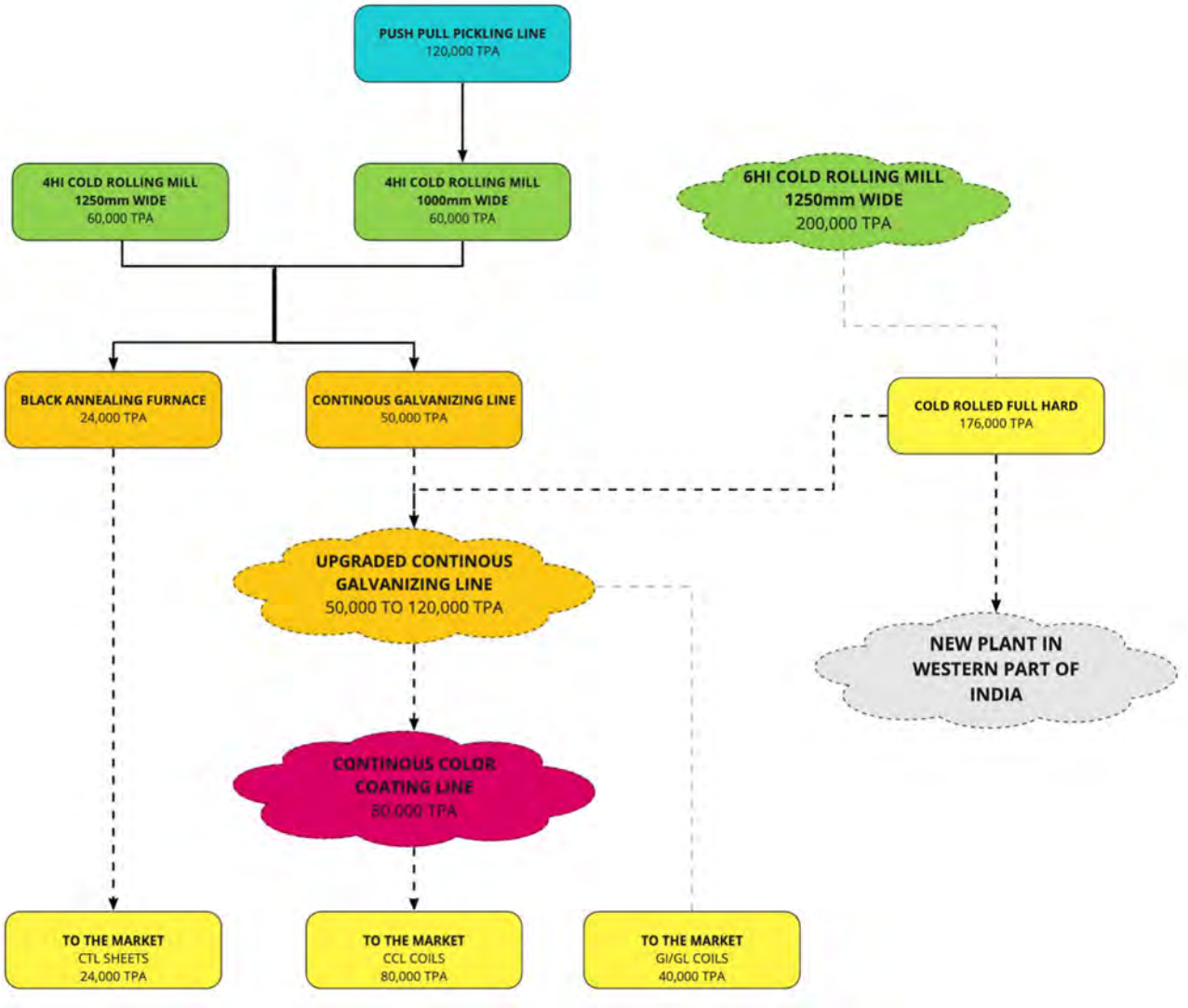

Figure 2. Upgraded Facility Flow Diagram.

INFERENCES

Plant, which 10 years ago had no structured vision and was unable to meet market expectation has turned into a profitable venture with a targeted market segment.

The capacity output from GPPL plant is 150,000 TPA with a thoughtful product mix. All this with a long sustaining and reliable partnership between GPPL and Yogiji Digi. This has reflected on the continuous interaction and transparently sharing each other's values and ethics.

The total capital outlay for the complete revamp and upgradation over the time has been 10.67 million US $. This translated into a cost of US $ 70 per ton of installed capacity without land and building structure. A true hallmark of success.

Success of this partnership has withstood all obstacles that may have come. Even pandemic could not stop the development and continuous improvement. Yogiji Digi stood by GPPL at times, a fact well acknowledged by Mr. Nitin Aggarwal, Director GPPL.

Owing to limited space in Ghaziabad (25 Acres ~ 100,000 m^2), GPPL feels confident that they can achieve greater heights. A new Cold Rolling Complex in Western part of India having a capacity of 250,000 TPA is planned. The project is expected with state-of-the-art technology and would essentially be serving GI/GL and color coated products. Land acquisition and all necessary permits have been attained. The project is slated to start by April 2022. This would add another milestone in this valued partnership and confirming Yogiji Digi as a reliable partner.

Our motto: Our growth lies in wellbeing of our customer and the trust we build and earn. Forever committed to the principles.

CASE STUDY #2: MARKET ORIENTED COLD COMPLEXES

Generally, the myth has been that in order to be successful in Cold Rolling Complexes the volumes must be large. This invariably leads entrepreneurs to scout for suitable locations where land and other utilities are available in abundance but creates a distance with the ultimate consumer.

To create entrepreneurs, we felt a need to develop a business model wherein our aim has been to be near to the consumers and yet CAPEX and OPEX should be affordable and not putting extra burden on skill sets to operate the plant.

We realized that end products like color sheets or in its formed shapes had reasonable localized demand. The consumers want very quick servicing of their demands and in small quantities. This at times is difficult for the larger Steel Mill to service due to various constraints of either logistics or the quantity.

Yogi Digi embarked upon solving this unique requirement by developing a mini Color Coating Line. Such Lines can produce between 30,000 TPA to 42,000 TPA depending up on the product mix selected.

The entrepreneur could quick start the project with minimum project management and avoiding large technical staff.

Highlights of the Line:

1. Steel widths from 1000 mm-1250mm- 1500mm
2. Thicknesses from 0.25 mm to 0.6 mm
3. Use of Colors- Any Color coating is possible
4. Line Speed- Up to 30 m/min
5. Production based on Two Shift working of 8 hours each per day.
6. Limited space requirement

The line is equipped with all major assemblies:

1. Uncoiler
2. Stitcher
3. Entry Accumulator/ Looper
4. Compact Degreasing section
5. Chemical Coater
6. Prime and Finish Coater
7. Oven
8. Incinerator
9. Quenching
10. Exit Accumulator/ Looper
11. Shear
12. Recoiler

All the assemblies are manufactured and assembled on pre-fabricated bases which are strategically split to ensure trouble free transportation. Necessary instruments and electrical components are assembled in workshop prior to shipment.

The above enables proper receipt of equipment at site and virtually eliminates any extended erection times. The total time for erection and commissioning could be limited to between 10-14 days. The Electrical Control Room is also dispatched as a pre-fabricated and assembled.

The need for complex Civil works is also eliminated and all the bases/skids can be installed on compacted and levelled earth by anchoring them with HILTI bolts. The same is true for electrical control room.

To impart operational flexibility, input Galvanized coils as input to Color Coating Line are envisaged to be of 5-6 Tons. This eliminates use of Over Head Cranes and the coils can loaded on the uncoiler by Fork Lift. With elimination of Over Head Cranes meant that heavy building structure is eliminated and thereby economizing project costs.

The Line size is a maximum of 65 meters long and a building width of about 18 meters and about 100 meters would be required. In addition to housing the CCL, the building dimensions would also ensure input coil storage of about 90 coils, approximately 3 days inventory apart from finished goods storage of about 40 coils, which would be about 1.5 days inventory.

The utility requirement for such line:

1.	Electricity:	1100 kW
2.	Industrial water:	1.8 m^3/hour
3.	Soft water:	2.0 m^3/hour
4.	Compressed air	100 Nm^3/hour
5.	Natural Gas	250 Nm^3/hour during start up only. Average consumption 13 Nm^3/ hour

The total area required for such an installation would be in tune of 6000 square meter. With no harmful effluents emitting from the plant, such plants could be envisaged in either urban or rural areas bringing the entrepreneur closer to his consumer base and offer flexible lots as desired by consumer in tailor made configuration.

Total Project Investment for such installation is estimated at equivalent 3 million US $ without cost of land. This brings the specific cost of about US $ 70 per Ton of installed capacity.

Payback calculated at current prices of Color Coated sheets is less than One Year.

CONCLUSION

Such projects are ideal for anyone having consumer connect and strong entrepreneurial drive. Such projects can either be duplicated at multiple sites as part of expansion or can be a steppingstone for backward expansion comprising of Pickling Line/ Cold Rolling Mill/ Galvanizing line.

1. The capacity output from GPPL plant is at 150,000 TPA with a thoughtful product mix.
2. The total capital outlay for the complete revamp and upgradation over the time comes out to only be $70/ton of installed capacity (excluding land and the building infrastructure).
3. This can be further optimized if there are no space constraints like the ones mentioned in Case Study#1
4. Payback period of Color Coated sheets is less than 1 year.
5. Yogiji Digi is currently working together with a customer located in Gujarat, India on such an economical and flexible line.
6. The line recently started operation in January 2022.

ACKNOWLEDGMENTS

Our sincere thanks to Gaurang Products Pvt. Limited, for providing insights to the internal company records. We enjoyed working together for the abovementioned projects and look forward to collaborate on more projects in the future.