

## HOWRAH GALVANIZING AND WIRE DRAWING CLUSTER

### *Introducing flue gas waste heat recovery techniques*

#### **Tags**

*Sub-sector:* Glass

*Location:* Howrah

*Partners:* BEE; IISWBM; FOSMI; HCCI

*Year:* 2010–11

#### **Background**

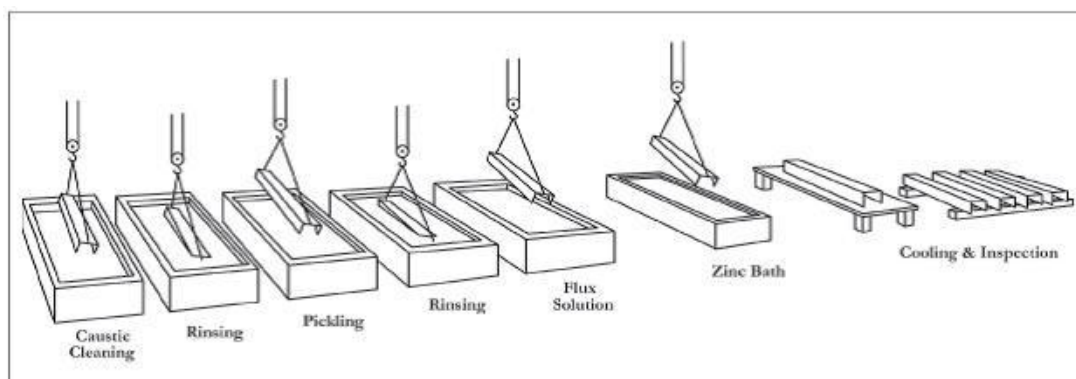
The Howrah industrial cluster, located close to Kolkata, has around 100 MSME units engaged in galvanizing and wire drawing processes (50 units in each category). These units operate for about 10–12 hours daily. The galvanizing units are located in Howrah Maidan, Liluah, Jangalpur and Dhulagarh. The wire drawing units are located in Liluah, Jangalpur, Tikipara and Dhulagarh.

Galvanizing is the process of applying a coating of zinc to iron surfaces to prevent corrosion.

Wire drawing is the process of reducing the cross-section of a metal wire by pulling it through a series of dies. The galvanizing units process a variety of iron products and components like nails, bolts, nuts, components of transmission towers, etc. that vary in size from a few centimetres to several metres in length, and in shape from thin wires to spheres. The wire drawing units process metal wires of various diameters ranging from 1.6 mm (14-gauge) to 5.1 mm (4-gauge).

#### **Context**

The Howrah units mainly deploy traditional, low efficiency technologies and operating practices. The raw materials used in galvanizing units include zinc, ammonium chloride, hydrochloric acid and dichromate powder. Galvanizing units mainly use furnace oil (FO), coal, wood and electricity to provide heat for different processes like cleaning, pickling, fluxing and immersion. The wire drawing units process mild steel, copper and aluminium wires, and mainly use electricity to operate equipment/ machinery like motors, annealing furnaces, extrusion units and machines for shaping, grinding, etc.



## Profile of units

Production capacities (tpa)*	Galvanizing		Wire drawing	
	Units	Share (%)	Units	Share (%)
Up to 500 tpa	15	31	27	53
500-1000 tpa	27	54	16	34
Above 1000 tpa	8	15	8	13
<b>Total</b>	<b>50</b>	<b>100</b>	<b>51</b>	<b>100</b>

\*tonnes per annum

Energy consumption by galvanizing and wire drawing units in Howrah				
Energy	Unit	Annual consumption		
		Galvanizing	Wire drawing	Total
Electricity	million kWh	0.87	2.24	3.11
Furnace oil	kL	732	-	732
Coal	tonne	1161	-	1161
Diesel	kL	19.2	12	31.2
Wood	tonne	600	300	900
LPG	tonne	-	1350	135
<b>Total energy consumption in the cluster: 3455 toe</b>				

Most of the units in the cluster are unaware of the importance and benefits of energy efficiency and lack access to improved technological options. There are no industry associations present in the cluster to address the relevant issues. However, both the galvanizing and wire drawing unit groups are represented in the Howrah Chamber of Commerce & Industry (HCCI) and the Federation of Small & Medium Industries (FOSMI).

## Intervention

The study conducted by the Indian Institute of Social Welfare and Business Management (IISWBM) under the BEE-SME Program shows that the energy component of product cost varies between 14–30% among galvanizing units, while it is about 14% in the wire drawing units. A number of energy conservation options have been identified that would help in improving the energy efficiencies of the galvanizing and wire drawing units.

Energy efficiency options for galvanizing and wire drawing units in Howrah			
Options	Potential benefits	Galvanizing	Wire drawing
Waste heat recovery from hot-dip furnace flue gases for air preheating	<ul style="list-style-type: none"> <li>12% energy savings (oil fired furnaces)</li> <li>8% energy savings (coal fired furnaces)</li> </ul>	✓	✓
Waste heat recovery from flue gases to boil flux solution	100% saving of diesel	✓	✓
Install air-fuel controller in furnaces for optimization of excess air	About 30% saving in furnace oil	✓	✓
Replace electric furnace with LPG-fired radiation furnace	Overall reduction in energy costs	–	✓
Replace low efficiency motors with energy efficient EEF1 motors	About 8% improvement in efficiency	✓	✓

## Results

Each galvanizing unit has two furnaces: one for heating the zinc vat and the other for heating the flux solution. The temperature required to boil the flux solution is only around 100°C, while the zinc vat furnace allows flue gases to escape at temperatures about 470° C. One of the galvanizing units in the cluster (Steel & Fence Corporation) started using flue gases from the galvanizing furnace to boil flux solution in place of a separate heating system. The usage of waste heat to heat flux solution has resulted in a diesel saving of 67 litres per day ('700,000 per year) with a marginal investment of '5000. The unit further utilized the waste heat in flue gases for preheating the combustion air, which has led to an additional saving of 60 litres of furnace oil per day.

Inspired by the benefits of this energy conservation measure, another galvanizing unit (L G Corporation) implemented an air preheater system with an investment of about `15000 and is achieving an energy saving of about `360,000 per year. The air preheater was fabricated by a local fabricator.

## Key lessons

Use of air preheater using waste heat recovery from flue gases has been proved as a viable low-cost option for energy saving in the Howrah galvanizing and wire drawing cluster. If all the galvanizing units in the cluster deploy the air pre-heating and flux solution heating technology demonstrated under this project, the potential savings in fuel would be 75 kilolitres of furnace oil

and 256,000 litres of diesel oil. Even if only the air pre-heating technology is implemented, it would help in saving 339 kilolitres of FO annually.