ENERGY EFFICIENCY IN FOUNDRY CLUSTER IN HOWRAH

.....An Initiative by TIFAC

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Technology Information, Forecasting & Assessment Council (TIFAC)

- An autonomous organization under Department of Science & Technology (DST)
- Set up in 1988
- To look ahead in technologies, assess the technology trajectories & Select technology areas of national importance.
- Technology Vision 2020 exercise In 1996 – Technology Vision for the country in emerging technology areas.
- Technology Vision documents covering 17 sectors
- Technology development Programmes by leveraging technology innovation through close association with academia and industry.
- Now initiating Technology Vision 2035

MSME Scenario in India

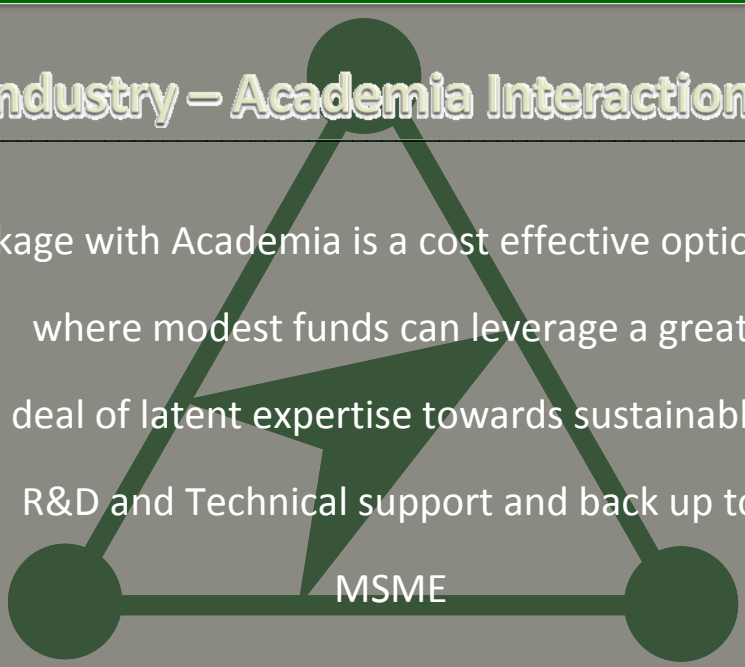
- MSMEs in India – more than 1.3 crores
- Spread around 400 manufacturing cluster besides 6000 artisan clusters.
- Employing more than 4 crores people
- Contribute in a major way to the country's economy – around 8% to the GDP and 40% of total exports
- Employment in large scale industries – 1 crore

Limitations

- Low capital base
- Concentration of management functions in one/two persons
- Inadequate exposure to international environment
- Inadequate R&D - Barring few all are facing technological obsolescence. There is no continuous infusion of R&D and Innovation in MSMEs
- Inability to access and invest in technology & maintain competitiveness

Industry – Academia Interaction

Linkage with Academia is a cost effective option where modest funds can leverage a great deal of latent expertise towards sustainable R&D and Technical support and back up to MSME



TIFAC–MSME Programme – Approach

- TIFAC programme starts with
  - Competent and willing Academia Partner
  - Comprehensive assessment of technology needs and gaps of cluster
  - Design and implementation of targeted technical interventions by the nearby academia / R&D institutions – act as knowledge partner
- Intervention include:
  - Product-process technology improvement
  - Testing and quality issues
  - Training / capacity building

Industry – Academia Interaction

- Assessment studies are commissioned in the select sectors through knowledge partners
- Two sets of Comprehensive Plan for Technical Interventions in the clusters –
  - *First generation* – to ensure short term benefits and keep faith and interest in the programme alive
  - *Second generation* – take some more time to bear results but very crucial for their sustenance, and relevance over a longer time frame.

Industry – Academia Interaction

Ten MSME Clusters were targeted initially:

- Casting (Howrah, West Bengal)
- Surgical Instruments (Baruipur, West Bengal)
- Carpet Industries (Bhadohi, U.P.)
- Diesel Pumps (Rajkot, Gujarat)
- Sports Goods (Jalandhar, Punjab)
- Scientific Instruments (Ambala, Haryana)
- Food Processing (Malda, West Bengal & Pune)
- Agricultural Implements (Karnal, Haryana)
- Pottery (Panchmura, Bankura, WB, Khurja, U.P.)
- Hand Made Paper (Sanganer, Jaipur, Rajasthan)

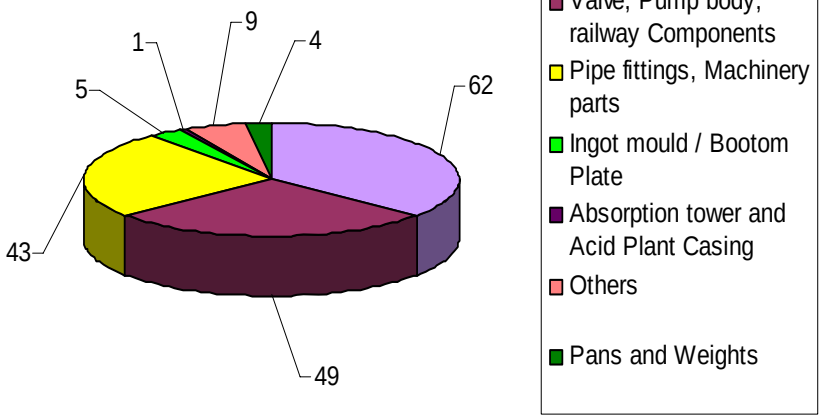
Other Clusters also being taken up

Howrah foundry cluster

Introduction

- 173 foundries are functional, producing about 1.0 Million Tonnes of Castings and employing about 1 lakh people.
- The total production value is around Rs. 8000 crores with around Rs. 2500 crores of exports

Type of Products Manufactured

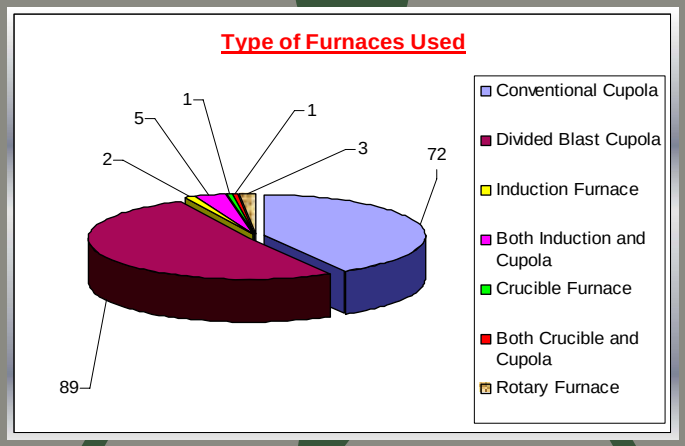


A FEW PHOTOGRAPHS OF TYPICAL FOUNDRY PRODUCTS OF HOWRAH FOUNDRY CLUSTER REQUIRING DEVELOPMENT AT R&D CENTRE ARE ILLUSTRATED BELOW :

Valves

Pipe Fittings

Furnaces



Scope of improvement exists even for the Divided Blast Cupola

Coke consumption & pollution is high in foundries using conventional cupola

Split coke charge wt. / 100 kg of metal charge				
Sl. No.	2 - 3 ton / hr Cupola		5 - 7 ton / hr Cupola	
	Divided Blast Cupola (kg)	Conventional Cupola (kg)	Divided Blast Cupola (kg)	Conventional Cupola (kg)
Foundry 1	11.00	14.00	10.00	13.00
2	15.00	20.00	13.00	17.00
3	14.00	19.00	12.00	16.00
4	13.00	17.00	14.00	19.00

Particular Case Study

Study	Before Modification	After modification
Coke used in Bed making	700 kg	750 kg
Coke used in split charges	160 kg*	100 kg**
Therefore charge coke saved / ton of metallic charge (160 – 100)	60 kg	

* *Actual figure used in Dhang's Iron Foundry*

** *Calculation figure from actual use of 80 kg of charge / 800 kg of Metallic (8/ 800 x 1000 = 100)*

Per day Saving of Coke

For 10 tons /day melting programme

- 60 kg x 10 = 600 kg of less charges coke used
- 750 kg – 700 kg = 50 kg of more bed coke used

Therefore total coke saving for 10 tons / day of melting programme = (600 – 50 kg) = 550 kg

Saving in Rupee Term

Considering price of coke as	₹ 12,000/ton
Saving for per 10 ton/day melting programme (550 x 12)	₹ 6,600.00
Taking cost of modification	₹ 1,90,000.00
Investment can be recovered in 1,90,000 / 6,600	29 melting days which for this foundry is roughly in 4 months***
Saving from less use of coke/year (90 x 6,000)	₹ 5,94,000.00

Recovery of investment is faster for higher tonnage of melting

*** Out of 52 weeks / year 45 weeks can be as working weeks. The foundry has 2 castings / week, hence 90 casting day/year can be taken.

Other Benefits

- Other benefits of modification:
  - The foundry reports 3.5 t/hr melting rate in place of 2.5 ton/hr before modification. Hence it took 4 hrs. So the saving is working 1 hr of electricity for ton/day melting.
  - There is a reduction of 34% coke after modification which will certainly lead to considerable reduction in both gaseous and particular emission.
  - Efforts to further spread this efficiency in the Clusters is ongoing