Need Assessment Study Report
For
Howrah Foundry Cluster

Under
MSME Design Clinic Scheme

Supported by
Ministry of MSME
Government of India

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1. INTRODUCTION

1.1 MSME Design Clinic Scheme
The Ministry of Micro, Small and Medium Enterprises has launched the National Manufacturing Competitiveness Programme (NMCP) to improve the competitiveness of the Micro, Small and Medium Enterprises (MSME) sector. The initiatives under the NMCP aim at increasing productivity, upgrading technology and conserving energy in the manufacturing processes, as well as expanding domestic and global market share of Indian MSME products. Out of the 10 components conceptualized under this Programme, one is “Design Clinic Scheme for Design Expertise to MSME Sector”.

The main objective of Design Clinic Scheme is to enhance the understanding and application of design and innovation in MSMEs. It aims to promote design as a value adding activity and integrating the same into the mainstream business and industrial processes of MSMEs. The scheme will bring Indian manufacturing sector and design professionals on to a common platform to provide expert advice and cost-effective solutions to MSMEs so as to enhance their competitiveness in the global markets through new product development or value addition for existing products.

1.2 Design Awareness Programme (DAP)
The design awareness programme is aimed at generating design awareness within the MSME members with cluster centric design information and participatory workshop for better understanding the role and benefits of design in industrial context of cluster. DAP is divided in 2 segments - Need Assessment Survey (NAS) and Design Clinic Workshop (DCW).

1.3 Need Assessment Survey (NAS)
Through Need Assessment Survey (NAS), a holistic map of MSME cluster and the respective units is developed generating design information about products, market scenario, technology, communication, research & development, and various industrial functions along with ergonomics, safety and skill upgradation through design research.

1.4 Design Clinic Workshop
Design Clinic Workshop (DCW) will help participants to understand the holistic scenario of cluster and benefit them with the support of design expert/s, for design intervention in opportunity areas explored during the programme. As an outcome of interactive design research, opportunity areas will be identified at cluster as well as units level for design interventions and design project/s in the future course of Design Clinic Scheme.

1.5 Cluster Selected
Metal Casting and Foundry Cluster, Howrah was selected for conducting the present Design Awareness Programme.

Foundry is a manufacturing factory where ferrous or non-ferrous metals are melted and poured into moulds to form metal castings. Usually, a foundry consists of design, pattern-shop, moulding, furnaces, heat treatment, machining, inspection and testing facilities customized for production run of one piece to a million metal parts.
1.6 Meeting with the Association and MSME members
To initiate the process of Need assessment Study, on 6th of December 2012, a meeting was arranged with the Howrah Foundry Association (HFA) in their office at Dashnagar, Howrah in presence of Mr. Asoke Sinha Roy (General Manager and Technical Advisor Cluster Development Programme, District Industries Centre, Howrah), Mr. Sandip Dutta (President, HFA), Mr. Shyamsundar Ghosh (General Secretary, HFA) and other members of the association. In the meeting, Mr. Sandip Dutta, President, HFA clearly explained their views against the norms introduced by the Pollution Control Board (PCB), Government of West Bengal. Later on, purpose of the Design Awareness Programme and the methods to be followed were discussed with the members present.

2. OBJECTIVE
The main objective of the present Need Assessment Survey (NAS) was to develop a holistic map of Metal Casting and Foundry Cluster, Howrah by exploring their products, market scenario, technology, communication, research & development, along with ergonomics, safety and overall skill up gradation through design research; and also to provide remedies for identified opportunities.

3. METHODOLOGY
The Need Assessment Survey (NAS) of the Metal Casting and Foundry Cluster, Howrah was carried out during the first and second week of December, 2012. A total of 18 units were visited for five days to carry out the survey. The following methods were implemented to collect the necessary information for the survey.

Questionnaire and direct observations were carried out in each of the units for enlisting and elaborating different information as well as problems faced by them. Each of the unit owners/partners were interviewed to know about their experiences in running the units using the existing technology, equipments, tools and work methods; type and procurement of raw materials, market need and the customer base.

Daily activities and different task components were also studied giving stress on sand preparations, hand moulding, core making, cleaning & finishing, machining, assembly and material handling. Existing ladle and other small hand tools were analysed to find out their merits and demerits from the view points of functionality, grips, comfort ability, etc.

Possibility of different work related musculoskeletal disorders (WMSDs) of the foundry workers were identified through direct observation and photography study. Different work related postures adopted by the foundry workers were recorded through still photography and later analysed, and ergonomically good and bad work postures were identified. A checklist was used to identify ergonomic issues of the overall work environment in the shop-floors including information like housekeeping, gangway, storage area, illumination, etc.
4. CLUSTER LEVEL STUDY

4.1 Foundry Clusters in India
Metal castings (Foundry Industry) are used in all possible engineering applications from sanitation to aerospace. In India it started around 1940 in Howrah and then later on spread to other states such as, Punjab, Gujarat, Maharashtra and Chennai. According to the recent World Census of Castings by Modern Castings (USA), India ranks as 2nd largest casting producer producing estimated 7.44 Million MT of various grades of Castings as per International standards.

At present, there are more than 5,000 foundry units in India and it provides direct employment to about 5,00,000 people and indirect employment to about 1,50,000 people. A peculiarity of the foundry industry in India is its geographical clustering. Typically, each foundry cluster is known for catering to some specific end-use markets. For example, the Coimbatore cluster is famous for pump-set castings, the Kolhapur and the Belagum clusters for automotive castings and the Rajkot cluster for diesel engine castings, etc.

There are approximately 4500 units out of which 80% can be classified as small scale units and 10% each as medium and large scale units. The foundry clusters in Belgaum, Coimbatore and Howrah are undergoing modernization under the industrial infrastructure up-gradation scheme.

4.2 Howrah Foundry Cluster
After First World War, West Bengal foundry industries got its present shape in Howrah cluster though the operations started long before since the second half of 19th Century based on the necessity of spares for jute and cotton industries. By the middle of the 20th Century, foundry industries in Howrah witnessed a phenomenal growth and became the pioneer in producing ferrous casting in India contributing almost 80% of the total production. However, since then the production of West Bengal has not increased much. During the last couple of years, the production has gone down. At present around 500 units exist in West Bengal with an installed capacity of 1 Million tones and around 95% of these units are concentrated in an approximate area of 78 square kilometer in the district of Howrah forming the ‘Howrah Foundry Cluster’. It comes under the Howrah Municipal Corporation. At present about 320 units are in Howrah employing around 12,000 direct and 18,000 indirect workers. The cluster is developed mainly with self generating traditional skill, though modernization started in some units very recently. Around 90% of the foundries are cupola based. Quite a few industries operate at a very large scale producing over 500 MT per month. Some of the large units export their products to the countries like the USA and Europe.

Role of Indian Foundry Association: Indian Foundry Association (IFA) is the apex body of Foundry associations in West Bengal and is interested in developing the Howrah Foundry Cluster with assistance from the Industrial Infrastructure Up-gradation Scheme (IIUS) promoted by Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry aims at providing strategic interventions for improving the infrastructure of industrial clusters in order to enhance their international competitiveness.
Major Challenges: Howrah foundry cluster faced a major challenge when environmental laws with emission standards for foundries were introduced in 1990. In 1995, in compliance of Supreme Court’s order on a Public Interest Litigation (PIL) on pollution issue, most of the foundries of Howrah were compelled to install pollution control equipment in their furnaces. With further pressure from West Bengal Pollution Control Board to lower down pollution level of Howrah municipal area within the admissible SPM (Suspended Particulate Matter) limit of 150 mg/Nm², the foundry owners were compelled to install Divided Blast Cupola furnace with Pollution control Device at their units. Moreover, Howrah foundry cluster has a plan to shift to a nearer place outside the Howrah Municipal Corporation within a time frame of 2010 in compliance with WBPCB ruling.

Recent Development: Realizing the need for modernization, expansion and relocation of foundries at Howrah, the Government of West Bengal had suggested West Bengal Industrial Development Corporation (WBIDC) and Indian Foundry Association to set up a Foundry Park near the vicinity of the existing Howrah foundry cluster. The Foundry Park will be developed on 924 acres of land on Ranihati-Amta Road, 5 kms off the National Highway 6, in Howrah (West Bengal). It is well connected also with NH-2, South-Eastern Railway and Kolkata and Haldia dock system. Connectivity with Kolkata is also easy and smooth through Kona Express way and Vidyasagar Setu (2nd Howrah Bridge).

4.3 Geographical Location
Howrah district is a district of the West Bengal state in eastern India. It has thousands of years of rich heritage in the form of the great Bengali kingdom of Bhurshut. The district is named after its headquarters, the city of Howrah.

Howrah is an industrial city, a municipal corporation in the Howrah district, West Bengal, India. Located on the west bank of the Hoogli river, it is a twin city to Kolkata. The two cities are connected by four bridges on the river Ganges and ferry services between various jetties in the two cities. Two national highways – NH-2 and NH-6 are connected to Howrah. Total area in Howrah District is around 1467 km².

The Howrah district lies between 22°48’ N and 22°12’ N latitudes and between 88°23’ E and 87°50’ E longitudes. Annual normal rainfall is 1461 millimeter per year. Annual maximum temperature varies between 32-39°C, whereas minimum temperature varies between 8-10°C.

Demographics: According to the 2011 census, Howrah district has a population of 4,841,638 with a population density of 3,300 inhabitants per square kilometer. Howrah has a sex ratio of 935 females for every 1000 males, and a literacy rate of 83.85%.
4.4 Cluster Map
Howrah foundry cluster is situated in an area of 5 to 6 square kilometre, both in rural and urban areas like Liluah, Ghusuri, Salkia, Belgachia, Benaras road, Santragachi, Belilious road, Dasnagar and Balitikuri.
4.5 Stakeholders
The following are the stakeholders:

a) Around 320 foundry units
b) Raw materials suppliers (manufacturers and traders)
c) Machine suppliers
d) Support firms - local buyer, like engineering units; national buyer, like large machine manufacturing units and international buyer
e) Technical business development service (BDS) providers

√ Technical institutions like Bengal Engineering & Science University, Shibpur, Howrah, W.B.; Jadavpur University, Kolkata, W.B.; The Energy and Resources Institute (TERI), etc.

√ Financial institutions like Federal Bank, Howrah Branch; Indian Overseas Bank, Kadamtila Branch, Howrah and Hong Kong Bank, Kolkata.

√ Associations like Howrah Foundry Association (HFA), Indian Foundry Association (IFA) and Indian Institute of Foundrymen (IIF).

4.6 Raw Materials and Supply Chain
The basic raw materials used by the foundry units are pig iron, different types of scrap, coke, sand, ferro alloys and binders. There are a number of suppliers of pig iron like Integrated Steel Plant, Burnpur (IISCO), TATA Metaliks, Neo Metaliks Limited, etc. They supplied through either their local sales depot or local traders. But irregular fluctuation and upward trend in the cost hit directly to the foundry units, especially, small and medium units mainly because of not having enough capital to neutralize the effect of variant price hike of raw material. Supply system of major fuel (hard coke) has no problem. Local manufacturers and suppliers are Beehive Grade, Low Ash Metallurgical (LAM) Coke, etc. Sand is locally available from various points. Local pattern makers are also there to make wooden pattern for moulding.

But the major concern is that the small and some medium firms are not conscious about the quality of major raw materials used. They are dependent on large amount of scrap/low graded iron in the furnace mix and do not bother on producing low-end products losing the domestic market of high value castings which has comparatively higher return on sale.
4.7 Main Products
As per the requirements of the customers, foundry units produce different products as listed down.

a) All kinds of valve (sluice valve, non-return valve, reflex valve, gate valve, globe valve, air valve and butterfly valve) as per customer requirements.
b) Railway components as per buyer's requirement.
c) Big pan for paddy boiling (agricultural and domestic).
d) Decorative casting, park fencing, etc.
e) Hand pump body and spares, rotary pump, gear box, etc.
f) CI Casting as per customer's requirement and specification.
g) Rice mill spares, jute mill parts, different machinery parts, etc.
h) Pipe fittings, bearing block, weighing scale parts, pulley of all sizes, etc.
i) Agricultural machinery parts, automobile machinery parts, thermal power plant machineries, etc.
j) Tea Industry equipment like heater and drier machine and machinery parts, etc.
k) CI pan, atta chaki, sanitary fittings, bed joint, etc.
l) Mixture drum, saw mill spares, etc.
m) Machine parts for leather industry.

Category wise the above products come under Grey Iron Casting (90%), SG Iron Casting (05%) and Steel Casting (05%).
4.8 Annual Turnover and Major Markets
Current annual turnover is between Rs. 1200 crores and 1500 crores. Most of the units lend their shop floor for casting to others who sale their products in the local market. Some of the units export their products to USA, UK and other European countries and on average it exports in the tune of Rs. 800 crores per annum.

Though Howrah foundry has lost its major share of market in the country, still it has managed to have 20% share in domestic market with ties up with local engineering units and some private big houses and Government sectors like railways, power plant apart from supply to local traders of sanitary items. But slowly it is losing ground at the domestic as well as international level in the face of growing challenges from emerging foundry clusters in India and some neighbouring Asian countries. Recent expansion in the automobile market foresees a remarkable increase in casting consumption during the years to come. There is also an increase in scope for the export of casting in countries like USA, Germany, UK, Middle East, etc.
4.9 Foundry Process at Cluster Level
The main common processes practiced in the foundry unit are mentioned below.

a) Pattern making: It is a model or the replica of the object to be casted. Most of the units get patterns from their clients. Few units make patterns while casting their own designs/products.

b) Hand mould and core making: This is a process by which a mould is manually formed. It is a vessel, the reverse image of the final component, into which the molten metal is poured. Moulds and cores are usually made of sand bonded with clay or other materials such as silicates, resins and isocyanates. Sand Preparation is the key to quality castings. Sand is packed around the pattern within a moulding box to form a mould section. The complete mould may consist of an assembly of two or more sections or parts.
c) **Metal preparation:** This is the process of segregation and preparation of alloys and scrap prior to the melting process. Depending on the type of foundry, the metal will include pig iron, metal ingots, and scrap. Sorting out undesirable or unsatisfactory metal will be an important process. Metal containing contaminants such as lead based paint are excluded. For safety reasons metal being added to a hot furnace must be dry.

d) **Metal melting:** In this process metals are melted, to a controlled temperature and composition, usually by a cupola furnace using coke.

e) **Casting:** In this process molten metal is poured by a ladle into the prepared mould for solidification.

f) **Removal of castings:** The cool casting is removed by knocking it away from the mould by hand or using vibrators or pneumatic tools. The process of removing the casting from the mould, is known as knockout or shakeout.
g) **Fettling and finishing**: This is the process of removing excess material from the casting to meet specified dimensions. Fettling and finishing involves a number of different processes depending on the type of foundry.

h) **Heat treatment**: In some units, the metallic structure and physical properties of the component are enhanced by the use of controlled temperatures.

i) **Assembly process**: After finishing, parts of the products are assembled usually within the shop floor.
j) Material handling and packaging: This is the process of handling materials throughout the casting process and the presentation of components for dispatch to meet the customer specifications.

k) Storage: Most of the units need sufficient space for storing finished items.

l) Delivery: Most of the time, delivery happens in the evening and during night.

m) Plant maintenance: This is one of the regular tasks carried out by most of the units so as to keep it in a safe operable condition.

n) Waste disposal: This is the process of removal, segregation and safe storage and disposal of unusable materials and by-products. Old sand and other debris are the significant non-recoverable waste produced in most metal casting processes.

Most of the foundry units carry out some of the above and many of these processes.
5. SWOT ANALYSIS

**Strength:**
1. Most of the raw materials are easily available.
2. Dealer network is good for supply of pig iron, steel scrap and coke, etc.
3. Past reputation of Howrah for the craftsmanship in metal casting.
4. Workers are capable of producing precision and quality work with traditional technology.
5. Strong presence in the domestic market with 20% share of the total casting produced in India.
6. Research and academic activities carried out by various institutes have generated.
7. A good amount of knowledge base to support the future challenges.
8. Most of the entrepreneurs are highly experienced in the foundry line.
9. Availability of testing labs. Formal linkages with the engineering colleges for refining of technologies.
10. Research and academic environment generating vast knowledge base.

**Weakness**
1. Irregular fluctuation and increase in the cost of raw materials.
2. Inability to procure raw material at competitive price.
3. Shortage of capital for small firms.
4. No skill up-gradation training for the workers.
5. Non-existence of any certificate/diploma course in modern foundry operations.
6. People prefer to work in other sectors.
7. Loosing ground in the national as well as international market.
8. Lack of awareness on export opportunities.
9. Reluctance in competitive participation in global market.
10. Most of the foundries are supplying only to the domestic market.
11. Lack of adequate infrastructural and technological development.
12. Absence of mindset to adapt the changing circumstances.
13. Poor knowledge base on occupational health hazards.
15. Lack of collective action for bulk purchase of raw material like pig iron, aluminum, coke and furnace oil for reduction of cost.
SWOT ANALYSIS

Opportunity
1. Recent expansion in the automobile market foresees a remarkable increase in casting consumption in this sector during the years to come.
2. Scope for common brand marketing.
3. As a result of recent trend in interdisciplinary research, enough opportunities have emerged before the metal casting cluster to flourish with the state of the art technology.
4. There is an increasing trend by the foreign consumers to import quality casting products due to closure of foundry unites in those countries.
5. Enough scope for export to European countries.
6. Growing environmental concerns in foundries of western countries provides opportunities for sourcing of castings from developing countries like China and India.
7. Encouraging the Government polytechnic to conduct more Diploma courses in Metallurgy so that foundry sector can get more people to work in this specialized area.

Threats
1. Competition is going to increase in the changed scenario of global market.
2. Other Asian competitors in particular China are emerging as potential supplier in global market due to better technology, infrastructural and other facilities like advancements in terms of quality, delivery schedule and effective price.
3. Due to liberalized economic policy, there is a high possibility of imported motor and pump-sets from cheaper manufacturing base like China.
4. Competition from other developing clusters in India like Ahmadabad, Hyderabad, etc.
5. The new environment policy emboldened by the Supreme Court of India for necessary energy savings, clean technology or eco-friendly process will impact the cost of castings.
6. Availability of skill workers is slowly reducing.
6. UNIT LEVEL STUDY

The study was carried out on the following 18 foundry units as mentioned below.

1. Imperial Casting Corporation
2. Shree Jagannath Iron Foundry (P) Ltd
3. Abhisek Iron Factory (P) Ltd
4. Urvashi Steel Industries (P) Ltd
5. Sourabh Casting
6. A K Ispat Udyog
7. Crescent Casting Corporation
8. Lakshmi Foundry Works (P) Ltd.
9. S C Ghosal & Son
10. Bhagyalakshmi Iron Foundry
11. Asit Iron Foundry Pvt. Ltd
12. Friends Casting
13. Sett Iron Foundry
14. M H Iron & Steel Works
15. M S Nandy & Sons (Founders) Pvt Ltd
16. Calcutta Iron Udyog
17. Bhagyadevi Factory (Foundry Division)
18. Dashurathi Foundry Works Pvt. Ltd.

During the study, following areas were looked into:

a) Storage spaces
b) Gangways
c) Factory offices
d) Ladles
e) Hand tools
f) Storage of raw materials
g) Wooden patterns
h) Manual materials handling
i) Occupational health hazards
j) Awkward and static work postures
k) Exposure to dust
l) Use of personal protective equipments
m) Transportation (logistics)
n) Human resources
o) Web presence
6.1 Imperial Casting Corporation

Unit Owner: Shri Nitish Kr. Mondal  
Unit established in the year: 1972  
Address: Imperial Casting Corporation  
C T I Road, Biradingi, P. O. Netajigarh  
Contact Details: 033 2651 6927; 98313 59296;  
E-mail: biswapriyamondal@yahoo.co.in  
Production capacity per annum: 1200 Metric Ton (approximately)  
Major items of production: C I valve (gate valve), non-return valve, etc.  
Customer base: Local market  
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)  
Employment: Direct – 10 and Indirect – 30

6.1.1 Housekeeping

a) Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not properly organised. Finished and unfinished castings, raw materials, tools and equipments, waste materials as well as wooden patterns are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work. It also increases chances of materials damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
b) Most of the time ladles and ladle-holders are lying here and there occupying a lot of space and obstructing passageways as well as other activities happening around that space.

It can also be a cause of accidents due to trip, fall and striking against projections, leading to severe injuries.

**Recommendation:** Specified space is to be there, so that after every use, ladles and its holders are stored properly. It saves space, helps proper utilisation of available spaces and also reduces chances of accidents and injuries.

In this workstation, where product finishing is going on, task light is placed in such a way that it creates direct glare to the operator leading to early onset of visual fatigue and low visual performance. Moreover, continuous standing for several hours put an extra static load on the musculoskeletal structure of the body. All these ultimately affect the quality of product finish.

**Recommendation:** Task light (CFL bulb with proper fixture) should be placed in such a way that it does not create glare. It will save electricity and will also give more uniform light than tungsten one.

To get rid of continuous standing, new ergonomic height-adjustable sit-stand stool should be used. It will reduce fatigue, promote more comfortable body posture and improve blood circulation.
6.1.2 Manual materials handling

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

**Recommendation:** Design and implement proper training programme for the shop floor workers for better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

It has been observed that before charging, furnace is manually feed with raw materials having different shapes, sizes and weights.

**Recommendations:**

i) Workers should be provided with an ergonomically designed basket for ease of carrying coke and other raw materials for the cupola furnace as well as in the shop floor.

ii) Simple mechanical device is to be designed and developed to replace manual carrying of coke and other raw materials for the cupola furnace.
6.1.3 Awkward and static work postures
Working in awkward postures or maintaining static body postures for long periods such as bending forward, to the side, or twisting; or staying in one body posture for a prolonged period while finishing product in standing or sitting posture, etc put an extra load on the musculoskeletal structure of the body and in the long run resulted in its disorders known as musculoskeletal disorders or MSDs.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

6.1.4 Raw materials
Unit is facing problem in getting quality raw materials at reasonable rate. Procuring raw materials in bulk and storing is a problem.

Increase of raw materials prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.1.5 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw material suppliers or it has to approach outside facilities which is not so easily available at the right time.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.1.6 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over to those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.1.7 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

6.1.8 Web presence
This unit is lacking its own website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and this is not enough.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.
6.2 Shree Jagannath Iron Foundry (P) Ltd

Unit Owner: Shri Anil Kumar Madhogaria
Unit established in the year: 1972
Shree Jagannath Iron Foundry (P) Ltd
P-200, Benaras Road
Howrah 711108, West Bengal
Contact Details: 033 2651 6173; 098301 44521;
e-mail: castiron@in.com
Production capacity per annum: 1500 Metric Ton (approximately)
Major items of production: Graded casting up to FG-25, pipe fittings, butterfly valves, multi-door check valve, non-return valve, machinery and sluice valve (100 mm to 20000mm) items.
Customer base: Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), Howrah Foundry development Cluster (HFDC)
Employment: Direct - 10 and Indirect – 40

6.2.1 Housekeeping
a) Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not properly organised. Finished and unfinished castings, raw materials, tools and equipments, waste materials as well as wooden patterns are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good work environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.2.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

Recommendation: Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

Most of the time ladles and ladle-holders are lying here and there occupying a lot of space and obstructing passageways as well as other activities happening around that space.

It can also be a cause of accidents due to trip, fall and striking against projections, leading to severe injuries.

Recommendation: Specified space is to be there, so that after every use, ladles and its holders are stored in that area. It saves space, helps proper utilisation of available spaces and also reduces chances of accidents and injuries.
6.2.3 Awkward and static work postures

During pouring, big hand-held ladles are carried and operated by two persons. These ladles are quite heavy and while pouring the awkward forward bending posture puts an extra load on the back resulting in an early onset of fatigue and in the long run it resulted in severe musculoskeletal disorders of the lower back.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work posture while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

6.2.4 Use of protective equipment

It has been observed that workers handling molten metal are not using any kind of personal protective equipments like protective clothing, safety shoes, hand gloves and face shields.

Foundry workers are usually very much reluctant in using existing protective equipments even if these are provided by the foundry, since they feel these affect their productivity and comfort. Those using are not getting proper protection. Sometime bad design of some of the protective equipments may also lead to problems to wear and work resulting in severe accidents with a reduction of efficiency and productivity.

Recommendation: Therefore, proper steps should immediately be taken to redesign new, ergonomically designed, low-cost protective equipment specifically for foundry workers for better and safe handling of molten metal which ultimately improve their health, productivity and quality of casting.
6.2.5 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw materials prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.2.6 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.2.7 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.2.8 Wooden patterns
It has been observed that wooden patterns are not properly stored rather scattered everywhere in open spaces exposed to direct solar radiation, rain and dust or kept inside the shop floor exposing to dust, heat and a number of chemicals.

Recommendation: Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out. This will keep pattern damage down to a minimum.

The wooden pattern has a very short lifetime. They need to be stored in proper places carefully. It is important that patterns should be stored in space which is as free of moisture as possible. This precaution will maintain the patterns in good condition and prevent warping and cracking.

Loose or worn dowel pins in a pattern will permit movement of the pattern parts during molding and can cause a shift in the casting. Poor pattern surface which is not noticed in the molding operation will ultimately affect quality of casting.

6.2.9 Factory offices
It has been observed that the factory office area is being used for meeting the client/parties and visitors and at the same time it is also being used for meeting the employees and workers for giving them some instructions.

Recommendations: The factory office area needs to be properly laid out and utilised for specific purposes. It is preferable to have a separate space for meeting the client or visitors where one can also properly display their main products highlighting their area of expertise and specialisation in foundry and metal casting.
6.2.10 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

Recommendation: Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only the products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.2.11 Web presence
This unit is lacking its own website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and this is not enough.

Recommendation: Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.2.12 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.3 Abhisek Iron Factory (P) Ltd

Unit Owner: Shri Amalesh Dutta
Unit established in the year: 1980
Address: Abhisek Iron Factory (P) Ltd
P-216, Benaras Road, Netajigarh
Howrah 711108, West Bengal
Contact Details: 033 3200 8275; 098300 61132
Production capacity per annum: 900 Metric Ton (approximately)
Major items of production: Spare parts of machines, valves and hand pump.
Customer base: Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)

6.3.1 Housekeeping
Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not properly organised. Finished and unfinished castings, raw materials, tools and equipments, waste materials as well as wooden patterns are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good work environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.3.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.3.3 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting posture.

**Recommendation:** An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.
6.3.4 Manual material handling
In most of the foundry shop floors, a number of workers are involved in frequent bending and lifting heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

**Recommendation:** Design and implement proper training programme for the shop floor workers on better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

6.3.5 Hand tools
A number of small hand tools are being used for carrying out different operations. Present study showed that though all the units are using same tools, but shape and size wise they differ from unit to unit. Most commonly used tool is called ‘kinor’ (local name). Size wise it differs from unit to unit.

**Recommendation:** There is a need to carry out an in-depth study on these tools for improving and standardising their design with due consideration of Indian anthropometric dimensions. It will help increasing the quality of core and mould making and thereby will improve quality of castings.
6.3.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable price.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.3.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw material suppliers or it has to approach outside facilities which is not so easily available at the right time.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.3.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.3.9 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation**: Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.3.10 Web presence
This unit has no web presence.

**Recommendation**: Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.3.11 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation**: There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.4 Urvashi Steel Industries (P) Ltd

Unit Owner: Shri Pramod Goel
Unit established in the year: 1980
Address: Urvashi Iron (P) Ltd
Urvashi Steel Industries (P) Ltd
3, ‘O’ Road, Belgachia
Howrah 711108, West Bengal
Contact Details: 033 2651 8012; 098315 01374;
e-mail: abhaygoel85@gmail.com
Production capacity per annum: 1000 Metric Ton approximately)
Major items of production: Tea industry, heater parts, atta chakki, sanitary, valve & pipe fittings, leather industry & other machinery parts, etc
Customer base: Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), Howrah Foundry development Cluster (HFDC), HCCI
Employment: Direct (10) and Indirect (70).

6.4.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.4.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.4.3 Lighting Environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit faces difficulties in cleaning these sheets.

**Recommendation:** These sheets need to be cleaned on a regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.4.4 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the back resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

6.4.5 Use of protective equipment
At the different stages of foundry processes, workers are exposed to dusts and fumes resulting in breathing problem to most of the workers. But they are not using any type of protective gears.

Foundry workers are usually very much reluctant to use existing protective equipments even if these are provided by the foundry, since they feel these affect their productivity and comfort. Those using are not getting proper protection. Sometime bad design of some of the protective equipments may also lead to problems to wear and work resulting in severe accidents with a reduction of efficiency and productivity.

Recommendation: Therefore, proper steps should immediately be taken to redesign new, ergonomically designed, low-cost protective equipment specifically for foundry workers dealing with molten metal which ultimately improve their health, work performance and productivity.
6.4.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.4.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw material suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.4.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.4.9 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.4.10 Web presence
This unit is lacking its own website. It has got its presence only in the site of ‘Howrah Foundry Development Cluster’ and this is not enough.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.4.11 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.5 Sourabh Casting

Unit Owner: Shri Anuj Goel
Unit established in the year: 1992
Address: Sourabh Casting
Iron Foundries and Engineers
P-278, Benaras Road, Belgachia
Howrah 711108, West Bengal
Contact Details: 033 2651 4521; 98310 20892
Production capacity per annum: 1000 Metric Ton approximately
Major items of production: Jute mill spare parts, tea garden machinery parts and different types of castings.
Customer base: Local market
Member of: Howrah Foundry Association (HFA)
Employment: Direct – 10-12 and Indirect – 30

6.5.1 Housekeeping
Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.5.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

Within the foundry shop floor overall housekeeping is very poor that adds ineffective time in total manufacturing process. Most of the workers are local and they use bicycle for their travel from home to the factory.

**Recommendation:** There should be dedicated space for keeping bicycles provided with low-cost easy to fabricate cycle stand. This not only improve the overall look and proper utilisation of work space but also strengthen good relation between the employer and the employees.
6.5.3 Wooden patterns
It has been observed that wooden patterns are not properly stored rather scattered everywhere in open spaces exposed to direct solar radiation, rain and dust or kept inside the shop floor exposing to dust, heat and a number of chemicals.

Recommendation: Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.

The wooden pattern has a very short lifetime. They need to be stored in proper places carefully. It is important that patterns should be stored in space which is as free of moisture as possible. This precaution will maintain the patterns in good condition and prevent warping and cracking.

Poor pattern surface which is not noticed in the molding operation will ultimately affect quality of casting.

6.5.4 Lighting Environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

Recommendation: These sheets need to be cleaned on regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.5.5 Awkward and static work postures
Mould and core making as well as finishing the products are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the back resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static postures while working within the foundry shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

Through out the day during the whole work process, there are lots of repetitive forward bending (stooping) and twisting of the body took place. This may lead to the development of different types of work related musculoskeletal disorders (WMSDs).

Recommendation: To get rid of long-term standing and bending, new ergonomic height-adjustable stool is to be designed and developed. It will stable the upper part of the body, will enhance precision work and thereby improve the quality of product.
6.5.6 Ladles
Single person use hand held ladles are quite heavy and while pouring the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

All single-person carried ladles are fitted with a shield or guard that protects them from exposure to radiant heat. But it is not sufficient enough to protect the users.

**Recommendations:** The handle as well as the guard needs to be redesigned from the view point of ergonomics and human factors to make it lightweight and more easy to carry and manipulate.

6.5.7 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is also facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.5.8 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw material suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.5.9 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.5.10 Branding and packaging
There is no properly designed logo, posters or packaging for
branding the company as well as proper dispatch of end products.
This has caused a complete loss of identity and there is no
acknowledgement or global recognition of the company and its work
output.

Recommendation: Unit has to take initiative and approach to some
professional to get help in branding and packaging. Common
Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing
processes can also be branded.

In today’s business, branding has a great role. It enhances product
recognition and helps in positioning the existing as well as new
products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept
of ‘Brand Equity’ in which the brand itself becomes valuable.

6.5.11 Web presence
This unit is lacking its own website. Even it has no presence in the
site of ‘Howrah Foundry Development Cluster’.

Recommendation: Unit has to take initiative to create its own
website. It will be the company’s online brochure or catalogue that
can be changed or updated on regular basis. It will save company’s
money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and
internationally. A website will broaden company’s base of
customers, members, distributors or suppliers. Through website
and internet, company’s business is open 24 hours a day, 7 days a
week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can
compete against the big companies.

6.5.12 Human resources
Unit has the problem of getting enough number of skilled workers.
New generation is not showing enough interest in the occupation.
Because of semi-skilled workers, number of rejection is increasing.
This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized
training center to upgrade the skills of the foundry workers. They
are unaware of the importance of quality both in processes and
products.
6.6 A K Ispat Udyog

Unit Owner: Shri Anuj Goel
Unit established in the year: 1992
Address: A K Ispat Udyog
Iron Founders and Engineers
2/2, ‘O’ Road, Belgachia
Howrah 711108, West Bengal
Contact Detail: 033 2651 3647
Production capacity per annum: 800 Metric Ton approximately
Major items of production: Jute mill spare parts, Sluice valve, bearing block and other castings.
Customer base: Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)
Employment: Direct – 10 and Indirect – 25

6.6.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.6.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.6.3 Wooden patterns
It has been observed that wooden patterns are not properly stored rather scattered everywhere in open spaces exposed to direct solar radiation, rain and dust or kept inside the shop floor exposing to dust, heat and a number of chemicals.

**Recommendation:** Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out. This will keep pattern damage down to a minimum.

The wooden pattern has a very short lifetime. They need to be stored in proper places carefully. It is important that patterns should be stored in space which is as free of moisture as possible. This precaution will maintain the patterns in good condition and prevent warping and cracking.

6.6.4 Ladles
Single person use hand held ladles are quite heavy and while pouring the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

All single-person carried ladles are fitted with a shield or guard that protects them from exposure to radiant heat. But it is not sufficient enough to protect the users.

**Recommendations:** The handle as well as the guard needs to be redesigned from the view point of ergonomics and human factors to make it lightweight and more easy to carry and manipulate.

6.6.5 Awkward and static work postures
Mould and core making as well as finishing the products are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

**Recommendation:** An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static postures while working within the foundry shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.
6.6.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is also facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.6.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.6.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.6.9 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.6.10 Web presence
This unit is lacking its own website. It has got its presence only in the site of ‘Howrah Foundry Development Cluster’ and this is not enough.

Recommendation: Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.6.11 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized training center to upgrade the skills of the workers. They are unaware of the importance of quality both in processes and products.
6.7 Crescent Casting Corporation

Unit Owner: Naresh Halder
Unit established in the year: 1984
Address: Crescent Casting Corporation
P-279, Belgachia, Howrah 711108, West Bengal
Contact Details: 033 2651 3467; 08319 20334;
e-mail: nareshhalder74@yahoo.com
Production capacity per annum: 800 Metric Ton approximately
Major items of production: Ferrous and non-ferrous machinery, electrical spares, engineering components, C I grid resistance (type A & B), G M bronze impeller and bush, aluminium impeller, gear and pinion, SS, bronze & gun metal shafts, Steel hammer, rubber liner roller, etc.
Customer base: Eastern Coalfields Limited, Western Coalfields Limited, Mahanadi Coalfields Limited, Indian railways and Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)

6.7.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.7.2 Awkward and static work postures

Mould and core making as well as finishing the products are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

**Recommendation:** An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

Throughout the day during the whole work process, there are lots of repetitive forward bending (stooping) and twisting of the body take place. This may lead to the development of different types of work related musculoskeletal disorders (WMSDs).

**Recommendation:** To get rid of long-term standing and bending, new ergonomic height-adjustable stool is to be designed and developed. It will provide a sitting surface, stable the upper part of the body and thereby will enhance precision work and improve quality of product.
6.7.3 Lighting for workstation
In both the workstations, where finishing of product is going on, task lights are placed in such a way that it creates direct glare to the operator leading to early onset of visual fatigue and low visual performance. Moreover, continuous standing for several hours put an extra static load on the musculoskeletal structure of the body. All these ultimately affect the quality of product finish.

Recommendation: Task light (CFL bulb with proper fixture) should be placed in such a way that it does not create glare. It will also save electricity and give more uniform light than tungsten one.

To get rid of continuous standing, new ergonomic height-adjustable sit-stand stool should be used. It will reduce fatigue, promote more comfortable body posture and improve blood circulation.

6.7.4 Factory offices
It has been observed that the factory office area is being used for meeting the client/parties and visitors and at the same time it is also being user for meeting the employees and workers for giving them some instructions.

Recommendations: The factory office area needs to be properly laid out and utilised for specific purposes. It is preferable to have a separate space for meeting the client or visitors where one can also properly display their main products highlighting their area of expertise and specialisation in foundry and metal casting.
6.7.5 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.7.6 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.7.7 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.7.8 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

Recommendation: Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.7.9 Web presence
This unit is lacking its own website. It has got its presence only in the site of ‘Howrah Foundry Development Cluster’ and this is not enough.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.7.10 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to upgrade the skills of the workers. They are unaware of the importance of quality both in processes and products.
6.8 Lakshmi Foundry Works (P) Ltd.

Unit Owner: Shri Satyajit Kundu
Unit established in the year: 1957
Address: 67, Benaras Road, Howrah 711101
Contact Details: 033 2651 8823; 98302 13686;
e-mail: lakshmifoundry@yahoo.com
Production capacity per annum: 700 Metric Ton approximately)
Major items of production: Hand pump and spares, railway components, mill parts, etc.
Customer base: Local market
Member of: Howrah Foundry Association (HFA)
Employment: Direct – 7 + 4; Indirect – 25 (varies)

6.8.1 Housekeeping
Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.8.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

Recommendation: Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

Most of the time ladles and ladle-holders are lying here and there occupying a lot of space and obstructing passageways as well as other activities happening around that space.

It can also be a cause of accidents due to trip, fall and striking against projections, leading to severe injuries.

Recommendation: Specified space is to be there, so that after every use, ladles and its holders are stored properly. It saves space, helps proper utilisation of available spaces and also reduces chances of accidents and injuries.
6.8.3 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static postures while working within the foundry shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

Finishing of castings and assembly of parts are also time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of end products.

Recommendation: A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work. It will stable the upper part of the body, reduce fatigue and thereby will enhance precision work and quality of product.
6.8.4 Manual materials handling
In most of the foundry shop floors, a number of workers are involved in frequent bending and lifting heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

Recommendation: Design and implement proper training programme for the shop floor workers on better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

6.8.5 Lighting Environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

Recommendation: These sheets need to cleaned on regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.8.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.8.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.8.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.8.9 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.8.10 Web presence
This unit has not its own website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and that is not sufficient enough to reach a wide customers.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.8.11 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.9 S C Ghosal & Son

Unit Owner: Shyamsundar Ghosh
Unit established in the year: 1961
Address: S C Ghosal & Son
Iron Founders
63/3, Benaras Road, Howrah 711101
Contact Details: 033 2651 8788; 098302 11998
Production capacity per annum: 800 Metric Ton approximately
Major items of production: Mixture drum, saw mill spares, rope pulley, motor body, etc.
Customer base: Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), Howrah Foundry development Cluster (HFDC)
Contract – molders.

6.9.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.9.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

Recommendation: Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.9.3 Storage spaces
Most of the time, inside the foundry shop floors, big spaces are being occupied by finished and unfinished products as well as unused and unnecessary materials which ultimately narrows down passageways obstructing free flow of man and materials and thereby hampering the whole manufacturing processes.

Recommendation: Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks.
6.9.4 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

**Recommendation:** An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

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6.9.5 Lighting Environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

**Recommendation:** These sheets need to cleaned on regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.9.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.9.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.9.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.9.9 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market. Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.9.10 Factory offices
It has been observed that the factory office area is being used for meeting the client/parties and visitors and at the same time it is also being used for meeting the employees and workers for giving them some instructions.

**Recommendations:** The factory office area needs to be properly laid out and utilised for specific purposes. It is preferable to have a separate space for meeting the client or visitors where one can also properly display their main products highlighting their area of expertise and specialisation in foundry and metal casting.

6.9.11 Web presence
This unit has no website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and that is not sufficient enough to reach a wide customers.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.9.12 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.10 Bhagyalakshmi Iron Foundry

Unit Owner: Shri Pradip Kr Dalui  
Unit established in the year: 1987  
Address: Bhagyalakshmi Iron Foundry  
Vivekananda Industrial Estate Baltikuri  
Bakultala, Howrah 711113, West Bengal  
Contact Details: 033 2653 0847; 098300 28037;  
e-mail: blif2009@gmail.com; pkdalui@gmail.com  
Production capacity per annum: 1750 Metric Ton (approximately)  
Major items of production: All types of gate, globe, check and  
butfly valves, pumps and graded castings.  
Customer base: Local market  
Member of: Howrah Foundry Association (HFA), Indian Foundry  
Association (IFA)  

6.10.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number  
of activities such as storing and stacking of materials and tools;  
controlling flow of materials; keeping equipments in order; and  
providing proper working and movement spaces for the people  
working there.

It has been observed that shop floor is not so properly organised.  
Finished and unfinished castings, raw materials, and tools and  
equipments, and waste materials are lying haphazardly here and  
there. It not only slowed down normal pace of work but also create  
additional work, increases chances of material damage, delays and  
serious injury.

Recommendation: Training on good housekeeping in foundry  
shop floor needs to be organised for all the foundry workers. Good  
housekeeping contributes not only to better work flow but also to  
safety and health and thereby improve productivity. It is an essential  
support to a good working environment.

Proper steps should immediately be taken to have no unnecessary  
items in the shop floor and keeping all necessary items in their  
proper places.
6.10.2 Wooden patterns

It has been observed that wooden patterns are not properly stored rather scattered everywhere in open spaces exposed to direct solar radiation, rain and dust or kept inside the shop floor exposing to dust, heat and a number of chemicals.

**Recommendation:** Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.

The wooden pattern has a very short lifetime. They need to be stored in proper places carefully. It is important that patterns should be stored in space which is as free of moisture as possible. This precaution will maintain the patterns in good condition and prevent warping and cracking. Loose or worn dowel pins in a pattern will permit movement of the pattern parts during molding and can cause a shift in the casting. Good pattern maintenance will go a long way toward minimizing the occurrence of shifts due to worn patterns.

6.10.3 Ladles

Single-person use hand held ladles are quite heavy and while pouring, the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

Most of the time ladles and ladle-holders are lying here and there occupying a lot of space and obstructing passageways as well as other activities happening around that space. It can also be a cause of accidents due to trip, fall and striking against projections, leading to severe injuries.

**Recommendation:** Specified space is to be there, so that after every use, ladles and its holders are stored properly. It saves space, helps proper utilisation of available spaces and also reduces chances of accidents and injuries.

All single-person carried ladles are fitted with a shield or guard that protects them from exposure to radiant heat. The handle as well as the guard needs to be redesigned from the view point of ergonomics and human factors.
6.10.4 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static postures while working within the foundry shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

6.10.5 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.10.6 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.10.7 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.10.8 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

Recommendation: Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.10.9 Web presence
This unit has no website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and that is not sufficient enough to reach a wide customers.

Recommendation: Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.10.10 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.11 Asit Iron Foundry Pvt. Ltd

Unit Owner: Mr. Asit Kr. Chatterjee (Owner) & Mr. Tanmoy Chatterjee, Director
Unit established in the year: 1992
Address: Asit Iron Foundry Pvt. Ltd
Vivekananda Industrial Estate, Baltikuri
Bakultala, Howrah 711113, West Bengal
Contact Details: 033 2653 1377; 98302 17777;
e-mail: aif_16@rediffmail.com; tanmoytanmoy6@gmail.com;
geemetals@gmail.com, www.asitironfoundry.com
Production capacity per annum: 1000 Metric Ton approximately)
Major items of production: Gear box, pulley, plummer block, pump body, pipe fittings, etc.
Customer base: Local market, SAIL, Indian railways, etc.
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)

6.11.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.11.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.11.3 Lighting Environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

**Recommendation:** A simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.11.4 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Similarly, during finishing of castings and assembly, workers spend a lot of time occupying awkward sitting posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of end products.

**Recommendation:** An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work. It will stable the upper part of the body, reduce fatigue and thereby will enhance precision work and quality of product.

6.11.5 Manual materials handling
In most of the foundry shop floors, a number of workers are involved in frequent bending and lifting heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

**Recommendation:** Design and implement proper training programme for the foundry workers on better and safe handling of heavy materials.

Non-motorized device needs to be designed to carry heavy loads within the shop-floor that can move on uneven surfaces, requires less manual effort to push or pull, shorten task time and also increases productivity.
6.11.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.11.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.11.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.11.9 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.11.10 Web presence
This unit has its own website. But there are enough scopes to improve the screen layout, user interfaces, etc.

Recommendation: Unit has to take initiative to up-grade the existing website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.11.11 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.12 Friends Casting

Unit Owner: Shri Pradip Kr. Tat / Kishore Tat
Unit established in the year: 1970
Address: Friends Casting
Founders & Engineers
8/6, ‘Q’ Road, Manshatala
Howrah 711105, West Bengal
Contact Details: 033 2651 7964; 94330 07722;
e-mail: ptathowrah@gmail.com; dilipiipl@gmail.com
Production capacity per annum: 500 Metric Ton approximately
Major items of production: Sluice valve, mixture machine drum parts, M J fittings, etc.
Customer base: Local market
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)

6.12.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.12.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.12.3 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

**Recommendation:** An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.
6.12.4 Manual materials handling
In most of the foundry shop floors, a number of workers are involved in frequent bending and lifting heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

**Recommendation:** Design and implement proper training programme for the shop floor workers on better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

6.12.5 Wooden patterns
It has been observed that wooden patterns are are not properly stored rather scattered everywhere in opens paces exposed to direct solar radiation, rain and dust or kept inside the shop floor exposing to dust, heat and a number of chemicals.

The wooden pattern has a very short lifetime. They need to be stored in proper places carefully. It is important that patterns should be stored in space which is as free of moisture as possible. This precaution will maintain the patterns in good condition and prevent warping and cracking.

**Recommendation:** Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.
6.12.6 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.12.7 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.12.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.2.9 Factory offices
It has been observed that the factory office area is being used for meeting the client/parties and visitors and at the same time it is also being user for meeting the employees and workers for giving them some instructions.

**Recommendations:** The factory office area needs to be properly laid out and utilised for specific purposes. It is preferable to have a separate space for meeting the client or visitors where one can also properly display their main products highlighting their area of expertise and specialisation in foundry and metal casting.
6.12.10 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.12.11 Web presence
This unit has no website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and that is not sufficient enough to reach a wide customers.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.12.12 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.13 Sett Iron Foundry

Unit Owner: Shri Sudipta Kr. Sett & Shri Subrata Sett
Unit established in the year: 1978
Address: Sett Iron Foundry
Founders & Engineers
8/1, ‘Q’ Road, Mansatala, Dashnagar
Howrah 711105, West Bengal
Contact Details: 033 2651 7453; 98300 46764;
e-mail: settiron@hotmail.com
Production capacity per annum: 1200 Metric Ton approximately)
Major items of production: Automobile casting, agriculture equipment casting, machinery parts and miscellaneous.
Customer base: Local market and Jamshedpur
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), Howrah Foundry development Cluster (HFDC), The Institute of Indian Foundry-men (IIF)
Employment: Direct – 26 and Indirect – 30

6.13.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

**Recommendation**: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.13.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

Recommendation: Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.13.3 Awkward and static work postures
Work in sitting posture for a long duration imposes static load on the body and results in early fatigue. In the foundry shop floor, a number of workers spend few hours everyday in this type of sitting posture without very little movement particularly during core and mould making. This ultimately hampers the quality of mould and castings.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.
Working in forward bending or stooping posture or handling and lifting loads in this posture is very strenuous resulting in early onset of fatigue and back pain in the long run. It happens frequently and several times in a shift. Proper step is to be taken immediately. 

**Recommendation:** Foundry workers should get an ergonomic training on safe work posture and how to get rid of the effects of awkward forward bending static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small height adjustable stool needs to be designed and developed for supporting the body and ease of work.

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**6.13.4 Storage spaces**

Most of the time finished and unfinished products are temporarily stored within the shop floor here and there occupying quite a space and making it unavailable for other purposes and thereby blocking passageways and obstructing free flow of man as well as materials. It not only hampers the whole manufacturing process but at the same time increases the chances of trips, falls and severe accidents.

**Recommendations:** Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be "rolled" out of the racks instead of "sliding" out.
6.13.5 Manual materials handling
In most of the foundry shop floors, a number of workers are involved in frequent bending and lifting heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

Recommendation: Design and implement proper training programme on the shop floor workers for better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

6.13.6 Ladles
Single person use hand held ladles are quite heavy and while pouring, the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

Most of the time ladles and ladle-holders are lying here and there occupying a lot of space and obstructing passageways as well as other activities happening around that space. It can also be a cause of accidents due to trip, fall and striking against projections, leading to severe injuries.

Recommendation: After every use, ladles and its holders should be stored in specific areas. It helps proper utilisation of available spaces and also reduces chances of accidents and injuries.

All single-person carried ladles are fitted with a shield or guard that protects them from exposure to radiant heat. The handle as well as the guard needs to be redesigned from the view point of ergonomics and human factors.
6.13.7 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.13.8 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.13.9 Lighting environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

Recommendation: These sheets need to cleaned on regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.13.10 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.13.11 In-house testing facility
The unit has its own in-house testing facility which is not common in the cluster. But the space is not properly planned and well organised. Sometime, space is also used for storing other materials.

**Recommendation:** Proper layout is to be developed from the view points of ergonomics and human factors with due consideration to placement of each of the equipments, ease of accessibility, minimum space required for operating it, proper lighting and ventilation, etc.
6.13.12 Web presence
This unit has no web presence which is very essential in today's business.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.13.13 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
**6.14 M H Iron & Steel Works**

Unit Owner: Mr. S L Hakim  
Unit established in the year: 1977  
Address: M H Iron & Steel Works  
P-292/4, Benaras Road, Belgachia  
Howrah 711108, West Bengal  
Contact Details: 033 2651 6197; 98300 41547  
Production capacity per annum: 1200 Metric Ton approximately)  
Major items of production: Tea garden and jute mill parts, pulley of all sizes.  
Customer base: Local market  
Member of: Howrah Foundry Association (HFA)  
Employment: Direct Labour – 20, Indirect labour – 50

**6.14.1 Housekeeping**

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

**Recommendation:** Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.14.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

Recommendation: Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.14.3 Awkward and static work postures
Work in sitting posture for a long duration imposes static load on the body and results in early fatigue. In the foundry shop floor, a number of workers spend few hours everyday in this type of sitting posture without very little movement. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the foundry shop floors. This will not only reduce the chances of occurring musculoskeletal disorders but also gives stability to the body and thereby helps in precision movement which ultimately improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.
6.14.4 Wooden patterns
It has been observed that wooden patterns are not properly stored rather scattered everywhere in open spaces exposed to direct solar radiation, rain and dust or kept inside the shop floor exposing to dust, heat and a number of chemicals.

The wooden pattern has a very short lifetime. They need to be stored in proper places carefully. It is important that patterns should be stored in space which is as free of moisture as possible. This precaution will maintain the patterns in good condition and prevent warping and cracking.

**Recommendation:** Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.

6.14.5 Ladles
Single person use hand held ladles are quite heavy and while pouring happens, the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

Most of the time ladles and ladle-holders are lying here and there occupying a lot of space and obstructing passageways as well as other activities happening around that space. It can also be a cause of accidents due to trip, fall and striking against projections, leading to severe injuries.

**Recommendation:** After every use, ladles and its holders should be stored in specific areas. It helps proper utilisation of available spaces and also reduces chances of accidents and injuries.

All single-person carried ladles are fitted with a shield or guard that protects them from exposure to radiant heat. The handle as well as the guard needs to be redesigned from the view point of ergonomics and human factors.
6.14.6 Hand tools
A number of small hand tools are being used for carrying out different operations. Present study showed that though all the units are using same tools, but shape and size wise they differ from unit to unit. Most commonly used tool is called ‘kinor’ (local name). Size wise it differs from unit to unit.

**Recommendation:** There is a need to carry out an in-depth study for improving and standardising the design of hand tools with due consideration of Indian anthropometric dimensions. It will help increasing the quality of core and mould making and thereby will improve quality of castings.

6.14.7 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.
6.14.8 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.14.9 Own design and export
This unit is getting design as well as ready made patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.14.10 Lighting environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

**Recommendation:** These sheets need to cleaned on regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.14.11 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.14.12 Web presence
This unit has no web presence which is very essential in today’s business.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.14.13 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.15 M S Nandy & Sons (Founders) Pvt Ltd

Unit Owner: Shri. Mrinal Kanti Nandy  
Unit established in the year: 1962  
Address: M S Nandy & Sons (Founders) Pvt Ltd  
P-282/1, Benaras Road, Belgachia  
Howrah 711108, West Bengal  
Contact Details: 033 2651 8756  
Production capacity per annum: 500 Metric Ton approximately  
Major items of production: All kinds of valve (sluice valve, non-return valve, reflex valve, gate valve and butterfly valve)  
Customer base: Local market  
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), Howrah Foundry development Cluster (HFDC)  
Employment: Direct labour – 7 to 8 and Indirect labour – 30 to 32

6.15.1 Housekeeping
Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

Recommendation: Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.15.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

Shop floor is very uneven hampering smooth flow of both materials and workers specifically while carrying molten metal. It can cause slips, trips and falls with consequences ranging from mild, such as scrapes, etc. to severe such as fractures or fatalities.

**Recommendation:** To control the risks, floors should be free from hoses, cords and rubbish; and it should be levelled, firm and durable without accumulated water.
6.15.3 Awkward and static work postures
Mould and core making as well as finishing the products are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme needs to be designed for foundry workers to know how to get rid of the effects of awkward work postures. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

6.15.4 Manual materials handling
In the shop floor, foundry workers are involved in frequent bending and lifting heavy objects; in the long run it can resulted in severe back problem. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

Recommendation: Design and implement proper training programme for the shop floor workers on better and safe handling of heavy materials. Workers should know where to store heavier or bulkier containers so that they can be handled within their power zone where they have the greatest strength.

Non-motorized device needs to be designed to carry heavy loads within the shop-floor that can move on uneven surfaces, requires less manual effort to push or pull, shorten task time and also increases productivity.

6.15.5 Lighting environment
This is a good practice of utilizing natural light during the day time and saving electricity. But most of these translucent sheets are covered with dusts blocking the entry of light. Unit face difficulties in cleaning these sheets.

Recommendation: These sheets need to cleaned on regular basis. Simple device needs to be designed and developed to clean these translucent sheets on regular basis to get maximum benefit out of it.
6.15.6 Storage spaces
Most of the time finished and unfinished products are temporarily stored within the shop floor here and there occupying quite a space and making it unavailable for other purposes and thereby blocking passageways and obstructing free flow of man as well as materials. It not only hampers the whole manufacturing process but at the same time increases the chances of trips, falls and severe accidents.

Recommendation: Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.

6.15.7 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.15.8 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.15.9 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.15.10 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.15.11 Web presence
This unit has no website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and that is not sufficient enough to reach a wide customers.

**Recommendation:** Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.15.12 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.16 Calcutta Iron Udyog

Unit Owner: Mr. V S Beriwal
Unit established in the year: 1976
Address: Calcutta Iron Udyog
P-89, Benaras Road
Howrah, West Bengal
Contact Details: 033 4001 6894; 98310 14450;
e-mail: calcuttairon@gmail.com; www.viditgroup.in
Production capacity per annum: 300 Metric Ton (approximately)
Major items of production: Plummer or bearing blocks, dumpers, gear box housing, axle pulley, brake drum, Railway signal spares and machinery parts.
Customer base: Local market (also export some of the products but at low volume)
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), Institute of Indian Foundrymen (IIF), Engineering Export Promotional Council (EEPC)
Employment: Direct Labour – 12 and Indirect Labour – 15

6.16.1 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.16.2 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

Recommendation: A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.16.3 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

Recommendation: Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting more to other countries.
6.16.4 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing.

**Recommendation:** There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.

6.16.5 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.

6.16.6 Web presence
Company has its own website which is regularly updated. But there is enough scope for improving the website from the view points of its content as well as presentation.

**Recommendation:** Unit has to take initiative to up-grade its existing website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.
6.17 Bhagyadevi Factory (Foundry Division)

Unit Owner: Shri Arun Kumar Paul  
Unit established in the year: 1961-62  
Address: Bhagyadevi Factory (Foundry Division)  
Makardah Road, Shanpur, dasnagar  
Howrah 711105, West Bengal  
Contact Details: 033 2667 0702; 98300 28035;  
e-mail: bdf@dataone.in; bdf11@gmail.com  
Production capacity per annum: 1000 Metric Ton approximately  
Major items of production: Railways item, export items, cast iron pan and various cast iron items.  
Customer base: Indian Railways, USA, UK, and Local market  
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA), The Institute of Indian Foundry-men (IIF)  

6.17.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

**Recommendation:** Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment.

Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.17.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

**Recommendation:** Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

In most of the foundry units, shop floors are uneven hampering smooth flow of both materials and workers specifically while carrying molten metal.

Slips, trips and falls are a common hazard in most workplaces, with consequences ranging from mild (such as scrapes) to severe (such as fractures or fatalities). To control the risks, floors should be free from hoses, cords and rubbish; and it should be levelled, firm and durable without accumulated water.

**Recommendation:** Shop floors should have dedicated wide, even and marked passageways free from any type of encroachments.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.
6.17.3 Storage spaces
Most of the time finished and unfinished products are temporarily stored within the shop floor here and there occupying quite a space and making it unavailable for other purposes and thereby blocking passageways and obstructing free flow of man as well as materials. It not only hampers the whole manufacturing process but at the same time increases the chances of trips, falls and severe accidents.

Recommendation: Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.

A large portion of the shop floor area is occupied with raw materials, unfinished and finished products. Even, most of the time, after use the hand ladles are kept here and there blocking the common passageway and increasing the chances of trips and falls.
6.17.4 Ladles
Single person use hand held ladles are quite heavy and while pouring, the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

All single-person carried ladles are fitted with a shield or guard that protects them from exposure to radiant heat. But it is not sufficient enough to protect the users.

**Recommendations:** The handle as well as the guard needs to be redesigned from the viewpoint of ergonomics and human factors to make it lightweight and more easy to carry and manipulate.

Even the weight of the two-person use hand held ladle is also quite heavy and while pouring, the awkward forward bending posture puts an extra load on the body resulting in an early onset of fatigue.

**Recommendations:** There is a need to modify the handle from the viewpoint of ergonomics and human factors to make it lightweight, more easy to carry and manipulate while pouring.
6.17.5 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for foundry workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

Fettling and finishing are also time consuming process where workers either sit or stand for long duration and at the same time repetitive movements also happen. This may lead to early onset of fatigue which ultimately affect the quality of finish.

Recommendation: To get rid of long-term sitting or standing and bending, new ergonomic height-adjustable stool needs to be designed. It will provide a sitting surface, stabilize the upper part of the body It will reduce fatigue, enhance precision work and thereby will improve quality of product finish.

For ease of fettling and finishing, workers could use some kind of ‘Scissor Table’, which can quickly position castings to proper working height. It will allow different sized workers to work at a comfortable height and in an ergonomically correct position.
6.17.6 Manual materials handling
In the foundry shop floor, a number of workers are involved in frequent bending, lifting and carrying heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

Recommendation: Design and implement proper training programme for the shop floor workers on better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

Worker operated non-motorized device needs to be designed to move heavy loads within the shop-floor that can move on uneven surfaces, requires less manual effort to push or pull, shorten task time; reduces product damage and thereby increase productivity.

Good practice of using small tub for carrying finishes and semi-finished products within the different parts of the foundry shop floor.
6.17.7. Scope for design improvements
This unit is casting a number of its own products like garden benches, lamp post, decorative railings, park fencing, etc designed and developed by them. These products are exported which is around 10% to 15% of total production.

**Recommendation:** Further design exploration is required as there are enough scopes for further improving the existing designs and product finishing.

6.17.8. Workstation
In most of the existing workstations workers are working either in sitting or standing posture for several hours. These are also not set up based on Indian body dimensions resulting in mismatch between the users, machine and the workstations. It ultimately affects the performance of the workers leading to poor quality of product finish.

**Recommendation:** To get rid of continuous sitting and/or standing, new ergonomic height-adjustable sit-stand stool needs to be designed. It will reduce fatigue, allow workers easily change their work postures, promote more comfortable body posture and improve blood circulation. This will improve work output.
6.17.9 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.17.10 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.17.11 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.

6.17.12 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

**Recommendation:** Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
6.17.13 Web presence
This unit has no website. It has got it’s presence only in the site of ‘Howrah Foundry Development Cluster’ and that is not sufficient enough to reach a wide customers.

Recommendation: Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.17.14 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.
6.18 Dashurathi Foundry Works Pvt. Ltd.

Unit Owner: Mr. Sekhar Kr. Kundu
Unit established in the year: 1972
Address: Dashurathi Foundry Works Pvt. Ltd.
Dharsa (monsatala), P.O. G I p (Colony)
Near Ramrajatala Rly. Station
Howrah 711321, West Bengal
Contact Details: 033 2657 1397
Production capacity per annum: 1000 Metric Ton approximately)
Major items of production: Cast iron pan, cast iron weights, pulleys, Durmush, etc.
Customer base: Local market.
Member of: Howrah Foundry Association (HFA), Indian Foundry Association (IFA)
Employment: Direct Labour – 17 and indirect Labour – 15

6.18.1 Housekeeping

Housekeeping is not only cleaning of shop floor. It covers a number of activities such as storing and stacking of materials and tools; controlling flow of materials; keeping equipments in order; and providing proper working and movement spaces for the people working there.

It has been observed that shop floor is not so properly organised. Finished and unfinished castings, raw materials, and tools and equipments, and waste materials are lying haphazardly here and there. It not only slowed down normal pace of work but also create additional work, increases chances of material damage, delays and serious injury.

**Recommendation:** Training on good housekeeping in foundry shop floor needs to be organised for all the foundry workers. Good housekeeping contributes not only to better work flow but also to safety and health and thereby improve productivity. It is an essential support to a good working environment. Proper steps should immediately be taken to have no unnecessary items in the shop floor and keeping all necessary items in their proper places.
6.18.2 Gangway
The passageway for carrying the molten metal is narrow, uneven and full of obstructions increasing the chances of slippage and severe fatal accidents.

Recommendation: Shop floors should have dedicated wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of other people and stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

6.18.3 Storage spaces
Most of the time, inside the foundry shop floors, big spaces are being occupied by finished and unfinished products as well as unused and unnecessary materials which ultimately narrows down passageways obstructing free flow of man and materials and thereby hampering the whole manufacturing processes.

Recommendation: Modular storage racks are to be designed for temporary storing of semi-finished and finished products as well as patterns, etc. Rack shelves should be integrated with roller wheels to reduce force needed to pull products and patterns out of storage racks. Products and patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out.
6.18.4 Awkward and static work postures
Mould and core making are time consuming process and most of the time, workers spend a lot of time occupying awkward sitting as well as standing forward bending posture. These awkward postures put an extra load on the body resulting in an early onset of fatigue which ultimately affect the quality of moulds.

Recommendation: An ergonomic training programme is to be designed for foundry workers on safe work posture and how to get rid of the effects of awkward and static work postures while working within the shop floor. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work.

6.18.5 Workstation
In most of the existing workstations workers are working either in sitting or standing posture for several hours where handling of loads as well as repetitive movements also happen. These are also not set up based on Indian body dimensions resulting in mismatch between the users, machine and the workstations. It ultimately affects the performance of the workers leading to poor quality of product finish.

Recommendation: To get rid of continuous sitting and /or standing, new ergonomic height-adjustable sit-stand stool needs to be designed. It will reduce fatigue, allow workers easily change their work postures. It will stabilize the upper part of the body, reduce fatigue, enhance precision work and thereby will improve quality of product finish.

Workspace layout is to be modified to reduce up and down movements of heavy loads. Preferably, it should move in between waist and shoulder level of the workers.
6.18.6 Manual materials handling
In the foundry shop floor, a number of workers are involved in frequent bending, lifting and carrying heavy objects; in the long run it can resulted in severe back problem.

Manual handling tasks are those where force is exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain any object. These occur during pattern and core making, loading furnaces, moulding, fettling, loading, unloading, etc.

**Recommendation:** Design and implement proper training programme for the shop floor workers on better and safe handling of heavy materials. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

Worker operated non-motorized device needs to be designed to move heavy loads within the shop-floor that can move on uneven surfaces, requires less manual effort to push or pull, shorten task time; reduces product damage and thereby increase productivity.

6.18.7 Raw materials
Usually most of the time raw materials are lying mixed with other materials leading to decreasing its quality and that ultimately affects the quality of castings. Unit is facing problem in getting quality raw materials at reasonable rate.

Increase of raw material prices resulted in increase of costs for production, but the selling prices remain more or less same.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices.

6.18.8 Quality control
This unit has no in-house quality testing facility for raw materials. It has to depend on the raw materials suppliers or it has to approach outside facilities which is not so easily available at the right time.

**Recommendation:** A Common Facility Centre (CFC) needs to be established in the cluster from where units can get this facility at the minimum cost.

6.18.9 Own design and export
This unit is getting design as well as readymade patterns mainly from local parties. After casting, it is finished and handed over those parties again.

**Recommendation:** Unit has to take initiative to design and develop its own products so that it can sell products directly to local and outside markets, even think about exporting it to other countries.
6.18.10 Web presence
This unit has no website of its own even not in the site of ‘Howrah Foundry Development Cluster’.

Recommendation: Unit has to take initiative to create its own website. It will be the company’s online brochure or catalogue that can be changed or updated on regular basis. It will save company’s money spending on printing and distribution costs.

Internet is the most cost effective way to trade nationally and internationally. A website will broaden company’s base of customers, members, distributors or suppliers. Through website and internet, company’s business is open 24 hours a day, 7 days a week and 365 days a year with no labour costs to watch it.

A website can be easily afforded by the small business that can compete against the big companies.

6.18.11 Human resources
Unit has the problem of getting enough number of skilled workers. New generation is not showing enough interest in the occupation. Because of semi-skilled workers, number of rejection is increasing. This also limits the scope for further improvements.

Recommendation: There is a need to establish specialized training center to constantly upgrade the skills of the foundry workers. They are unaware of the importance of quality both in processes and products.

6.18.12 Branding and packaging
There is no properly designed logo, posters or packaging for branding the company as well as proper dispatch of end products. This has caused a complete loss of identity and there is no acknowledgement or global recognition of the company and its work output.

Recommendation: Unit has to take initiative and approach to some professional to get help in branding and packaging. Common Facility Centre (CFC) in the cluster can also take this initiative.

It is not only products and services, even the product manufacturing processes can also be branded.

In today’s business, branding has a great role. It enhances product recognition and helps in positioning the existing as well as new products among the customers and in the competitive market.

Strong brands can lead to financial advantages through the concept of ‘Brand Equity’ in which the brand itself becomes valuable.
**Product Design**

**Design Initiative:** A Common Design and Development Centre needs to be established in the cluster which will provide service to all the foundry units.

Each unit has to take initiative to design and develop its own products so that it can sell it directly to local and outside markets, even think about exporting it to other countries.

**Organizing Workshops on Design, Innovation and Ergonomics:** Initiative has to be taken to organize workshops on regular basis for the unit representatives on the different areas like ‘Design Innovation’, ‘Ergonomics in Foundry’, etc to sensitize them to the knowledge of design, ergonomics and innovation and also to give them hands-on experience on how these can be used as tools for betterment of products, shop floors, workspaces and their business.

**Patterns**

CNC machines are to be used in pattern making to get high quality and better finish.

Unit has to give importance on proper handling and storage of wooden patterns.

**Modular Storage Racks:**

Modular storage racks are to be designed for temporary and/or permanent storage of patterns. Rack shelves should be integrated with roller wheels to reduce force needed to pull patterns out of storage racks. Patterns will rest on wheels instead of the shelf surface so they will be “rolled” out of the racks instead of “sliding” out. This will reduce the amount of force required to pull or push heavy patterns.

**Sand Preparation**

Existing sand mixing machines need to be upgraded and redesigned from the view point of better usability.
Cupola Furnace

Better Design of the Cupola Furnace: R&D is required for better design of the cupola furnace keeping in mind less heat dissipation to the shop floor, simpler construction, easy to repair within minimum time and less pollution to the environment.

Spout Extensions Used to Fill Ladles: Design and development of an extension to the spout on the cupola furnace for ease of filling the hand held ladles. It would reduce forward reaching needed to move worker away from heat, reduce awkward shoulder postures and thereby would also reduce stress on shoulders.

Raw Materials

Common Facility Centre: A Common Facility Centre (CFC) needs to be established in the cluster from where units can buy quality raw materials at reasonable prices as and whenever required.

Storage Spaces: Each unit should have proper storage spaces for raw materials to avoid unnecessary contamination which decreases quality of castings.

Mechanical Devices to Dump Raw Materials into Furnace: There is a need to develop a simple mechanical device to dump raw materials into top-loading furnace. It will eliminate manual lifting and tossing of materials. At the same time, it will also reduce back and shoulder injuries, exposure to heat and increase productivity.
Core Making and Hand Moulding

Automatic Moulding Machine: R&D Activities are required to upgrade the whole process and develop functional & cost-effective machines particularly to join mold halves together to get better quality of castings. Attempts have to be taken to reduce the total time taken in the mould making process.

Training Programme: An ergonomic training programme is to be designed for workers on safe work posture & how to get rid of the effects of awkward & static postures during core and mould making. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their skill & quality of work output.

Small Ergonomics Stool: Task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work. It will stable the upper part of the body, will enhance precision work and thereby improve the quality of mould.

Hand Tools: There is a need to carry out an in-depth study on the hand tools used in mould making process for improving and standardising their design with due consideration to the Indian anthropometric dimensions. It will help increasing the quality of core and mould making and thereby will improve quality of castings.
Pouring Molten Metal

**Single-person carried ladles:** Handles and guards need to be redesigned from the viewpoint of ergonomics and human factors.

**Storage Stands:** Ergonomic storage stand is to be designed and developed for safe storing of hand ladles which will take minimum space in the shop floor.

**Ceramic Ladles:** Foundry ladles are usually made of a mild steel shell with a refractory lining material like fireclay, etc and are quite heavy. Ceramic ladles, which are lighter than iron ladles and easier to lift, are to be designed and developed. Ceramic ladles have a number of advantages - they are not melted nor deformed by high temperatures, resist slag and dross buildup and provide a long service life. It will also reduce physical exertion of the back and arms of the users and thereby will reduce the chances of MSDs.

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**SCOPE FOR DESIGN INTERVENTION**

- **Product Design**
- **Patterns**
- **Core Making & Hand Moulding**
- **Sand Preparation**
- **Sand Recovery**
- **Mould**
- **Mould Cooling**
- **Casting Knockout**
- **Castings**
- **Fettling**
- **Assembly, Painting & Labeling**
- **Dispatching**
- **Raw Materials**
- **Cupola Furnace**
- **Pouring Molten Metal**

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**Personal Protective Equipments (PPEs)**

**Protective clothing:** New ergonomic light weight, heat reflective, well ventilated & easy to wear protective clothing made up of heat retardant material to protect from radiant heat, sparks and molten metal.

**Face shield:** New ergonomic light weight, well ventilated and easy to wear face shield fitted with adjustable head-gear to protect from radiant heat, sparks and bright light coming from the molten metal.

**Hand gloves:** New ergonomic easy to wear hand gloves with good fittings and made up of heat retardant material to protect from radiant heat, sparks and molten metal.

**Safety shoes:** New ergonomic light weight, heat reflective, well ventilated and easy to wear safety shoes made up of heat retardant material and fitted with hard toes to protect from radiant heat, sparks, molten metal and falling from heavy objects.
**Pouring Molten Metal**

**Gangway:** Shop floors should be redesigned keeping in mind wide and marked passageways free from any type of encroachments.

The route used to transport molten metal needs to be marked; as short as possible, even and clear of any stray objects.

Where molten metal is transported by hand, passageways should be even and pouring aisles should be at least 800 mm wide.

**Casting Knockout**

**Impactors for Shakeout Work:** Ergonomically designed mechanical impactors should be developed supported by balancers that can remove sand, gating, and metal from castings. It will reduce manual force needed to separate sand and castings properly.

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**SCOPE FOR DESIGN INTERVENTION**

1. **Product Design**
2. **Patterns**
3. **Core Making & Hand Moulding**
4. **Mould**
5. **Mould Cooling**
6. **Casting Knockout**
7. **Castings**
8. **Fettling**
9. **Packaging**
10. **Assembly, Painting & Labeling**
11. **Raw Materials**
12. **Cupola Furnace**
13. **Pouring Molten Metal**

**Castings**

**Training Programme on Handling Castings:** Design and implement proper training programme for the shop floor workers on better and safe handling of heavy loads. Ergonomics principles need to be implemented like store heavier or bulkier containers so that they can be handled within the power zone of workers where they have the greatest strength.

**Non-Motorized Load Carriers:** Worker operated non-motorized devices needs to be designed to move heavy loads within the shop-floor that can work on uneven surfaces, requires less manual effort to push or pull, shorten task time, reduce damage of castings and also increase productivity.
Fettling

Casting Positioner for Hand Grinding Operations: Design and development of ‘Casting Positioner’, which can rotate 360° around the base stand, can position 90° around the arm and is adjustable in the vertical direction. During hand grinding operation, it will allow the worker to use the grinding tools in the ergonomically correct position and reduce the risk of lower back and shoulder injury. It would definitely improve both productivity and quality of the castings.

Scissor Table for Hand Grinding Operations (Small Castings): Design and development of ‘Scissor Table’, which can quickly position castings to proper working height for ease of hand grinding operations. It will allow different sized workers to grind on castings at a comfortable height and in an ergonomically correct position. This will reduce chances of operators injuring their lower back. It would definitely improve both productivity and quality of the castings.

Slat Table for Hand Grinding Operations (Large Castings): Design and development of ‘Slat Table’ for positioning larger castings to proper working height for ease of hand grinding operations. It will drastically improve the worker’s posture and reduce the risk of lower back injury to the workers. It would definitely improve both productivity and quality of the castings.

Large Casting Table for Hand Grinding Operations: Design and development of ‘Large Casting Table’ for positioning larger castings to low sitting working height to get the work-piece at better height for ease of hand grinding operations. By raising the casting from the floor, the posture of the workers would be improved and it will reduce the worker’s risk of lower back injury and would also definitely improve both productivity and quality of the castings.
Fettling

Sit-Stand Stools
To get rid of continuous standing, new ergonomic height-adjustable sit-stand stool is to be designed and developed. It will reduce fatigue, allow workers easily change their work postures (e.g., from standing to leaning on stool), promote more comfortable body posture and reduce extended reaches and improve blood circulation.

Training Programme: An ergonomic training programme is to be designed for workers on safe work posture while working in standing posture and safe use of different motorised as well as non-motorised hand tools. This will not only reduce the chances of occurring musculoskeletal disorders but will also improve their quality of work output.

Small Stool: A task specific small stool needs to be designed and developed for supporting the sitting posture and ease of work while finishing castings.

Workstation Design: New ergonomic workstations need to be designed and developed with due consideration to Indian anthropometric dimensions, ergonomic work surface height, ease of reach to all the work elements and minimum lifting or lowering of loads. Workstation should be fitted with an adjustable sit-stand stool. It will drastically improve the worker’s posture and reduce the risk of lower back injury, improve precision movement and thereby quality of product finish.
SCOPE FOR DESIGN INTERVENTION

Assembly, Painting and Labeling

Workstation Design: New ergonomic workstations need to be designed and developed specifically for assembly work to have minimum lifting and lowering of product parts. It will save time, increase precision and protect workers from early onset of fatigue. This will increase productivity.

Paint Booth: New ergonomic dust proof paint and drying booths need to be designed within the shop floor to get better finish.

Training on Product Graphics: A training programme is to be designed on product finish and product graphics to sensitize the people involved in the business.

Packaging

Training on Packaging: A training programme is to be designed on product packaging and different innovative ways to sensitize the people involved in this business.

Website: Create, design and maintain website for each of the foundry units which will be interactive containing images and information on products, factory details, and also provide facility for making purchases through internet.
8. INITIATIVE TO BE TAKEN AT THE CLUSTER LEVEL

8.1 Common Facility Centre (CFC)

A common facility centre needs to be established for the purpose of -

a) Promoting linkages between various agencies relevant to cluster development;

b) Encouraging and facilitating implementation of design interventions and innovations actively involving the cluster players;

c) Assisting in networking between raw material suppliers, manufacturers, buyers, and technology providers;

d) Identifying better and cost effective technologies suitable for the cluster;

e) Providing need based financial assistance to the manufacturers under the cluster program;

f) Developing ‘Raw materials bank’ so that units can get required quantity of certified quality materials at reasonable price;

g) Providing training for human resource development;

h) Providing expert’s view on technology up-gradation;

8.2 Vocational Programme in Foundry

Initiative has to be taken to introduce a vocational programme in foundry and relevant technology in a few selected CBSE affiliated schools in the locality of Howrah foundry cluster on pilot bases.

8.3 Technology Up-gradation

Cluster should take the lead role in the domestic as well as global market by adopting a realistic and flexible action plan for technology up-gradation, networking for better marketing as well as improving infrastructure for modernization of the units. Cluster should approach the State Government and the state polytechnics to introduce courses on foundry and metal casting.

8.4 Organizing Workshops on Design, Innovation and Ergonomics

Initiative has to be taken to organize workshops on regular basis for the unit representatives on the different areas like ‘Design Innovation’, ‘Ergonomics in Foundry’, etc to sensitize them to the knowledge of design, ergonomics and innovation and also to give them hands-on experience on how these can be used as tools for betterment of products, shop floors, workspaces and the overall business.
8. INITIATIVE TO BE TAKEN AT THE CLUSTER LEVEL

8.5 Organizing Interactions with the Experts

Initiative has to be taken to organize lectures and interactions, on regular basis, with designers, ergonomists, foundry experts and technologists from different institutes, universities and industries to discuss on what is happening in the field around the world particularly in the developing countries and also to identify scopes for innovation and design improvements for the benefit of the business.

8.6 Organizing Awareness Programme

Awareness programmes need to be organised at the cluster level to encourage the individual foundry units to perform as leader actor in the domestic as well as global market adopting a realistic and flexible action plan with proper thrust on technology upgradation, marketing, networking, improvement in infrastructure including CFC and modernization.

8.7 Organizing Conferences

At the cluster level, every 3 to 5 year, national and/or international conferences need to be organised to create a common platform for foundry experts, factory owners, managers, designers and ergonomists to exchange their ideas, experiences, research outcomes and designs.
9. INITIATIVE TO BE TAKEN AT THE GOVERNMENT LEVEL

1) Provide a common quality infrastructure to the foundry cluster through public-private partnership.

2) Make adequate budgetary provisions specifically in the area of training, capacity building, skill improvement, marketing inputs, innovation, design and product development area.

3) Remove avoidable regulatory burdens that prevent foundry units from functioning efficiently (ensuring uniform regulations on environment, labour, etc).

4) Develop and strengthen existing institutions that provide skills for competitiveness as well as R&D support to the foundry cluster.

5) Policy to facilitate export promotion and attract foreign direct investment (FDI) in the foundry cluster.

6) Provide assistance to State Government in the cluster formation through strengthening District Industries Centre (DIC) besides NGOs and reputed institutions that have capacity to undertake this type of work.

7) Develop provisions for acquiring basic necessities like land and capital as well as advanced factors such as skilled labor, technology and equipment, faster and cheaper transportation, good road conditions, etc.

8) Provide training to the cluster on 'Green Foundry' concept minimizing emissions, efficient use of raw materials and energy, optimum utilisation of the process, recovering and recycling of the waste materials.

9) Newly opened Engineering colleges should have metallurgical branch as a policy decision in order to cater to the needs of growing demand of metallurgist in foundry industry.