Diagnostic Study of Fly Ash Brick Cluster in Koraput, District of Odisha

Submitted to: The DC (MSME), Ministry of MSME (Government of India)

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MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

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Project Team

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Introduction

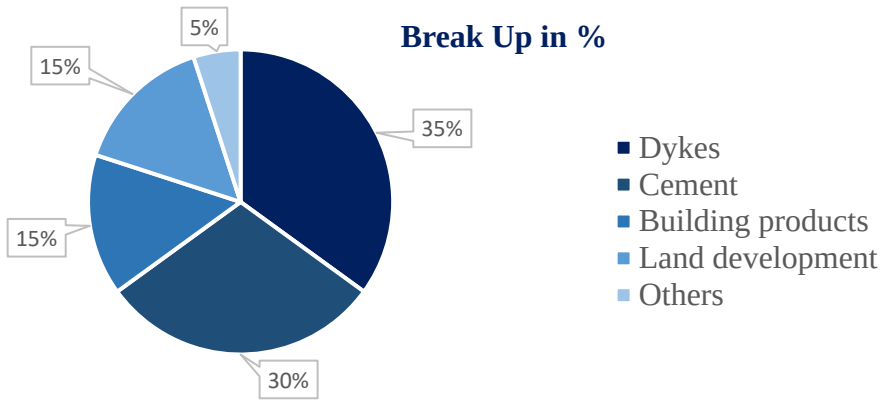
In India the annual production of fly ash is nearly 100 million tons per year. At present most of the fly ash is being dumped as waste. The disposal of the fly ash is a serious hazard to the environment that consumes millions of rupees towards the cost of its disposal. About 14000 Ha of land have already been used for dumping it and another thousands of Ha Would be required in future. To reduce the problem of the disposal of fly ash or to solve it on long term basis, it is necessary to utilize it as a raw material for fly ash-based products or for other beneficial purposes in an environmentally safe manner. The Government of India is trying to achieve a significant increase in fly ash utilization since last few years by numerous activities.

Fly ash is a very fine glassy powdery material, predominantly silica, generated as a byproduct after combustion of coal in thermal power plants. Its particles are hollow, spherical in shape, grey in color with fineness of 200-400 m2/kg. Recently, use of fly ash has started picking up for utilizations such as: bricks, roads and embankments, cement manufacturing and part substitution of cement. More and more state Governments are now giving focus and importance to ash utilization and special groups are being created. TIFAC has initiated a Fly Ash Utilization Programme. A number of agencies are approaching Fly Ash Utilization Programme of TIFAC for assistance and guidance for utilization and safe management

Fly Ash: Present National Scenario

Of the 100 million tons of annual fly ash production, only about 3%-5% was being utilized. One reason for its low-level utilization is the lack of awareness and public confidence on feasibility/ commercial viability of the available technologies for manufacture of fly ash-based products. Fly ash is one of the world's most commonly used pozzulana. Pozzulanas are siliceous or siliceous/aluminous materials which, when mined with water, form segmentations compounds. Fly ash can be used in concrete as a partial replacement for ordinary Portland cement (opc). Fly ash can be introduced in concrete directly, as a separate ingredient at the concrete batch plant or, can be blended with the opc to produce blended cement, usually called portland-pozzolana cement. Now a days, fly ash blended cements are produced by several cement companies in the country. Currently in the concrete industry, the percentage of fly ash as part of the total cementing materials in concrete normally ranges from 15 to 25%, although it can go up to 30-35% in some applications. The use of fly ash in concrete can also address some specific durability issues such as sulphate attack and alkali silica reaction.

Ash content in Indian coals:	Average 40%
Present annual consumption of coal in thermal plants:	300 million tons
Present generation of fly ash: (@0.7 tons of coal per MV	100 million tons
Present utilization of fly ash:	15 TO 18%
Land occupied by ash ponds at present:	1,00,000 acres



Scenario by 2012 AD:	
Projected capacity of coal based thermal power:	1,20,000MW
Projected fly ash generation:	170 million tons
Projected additional land demand for ash ponds:	50,000 acres
Brick production nation-wide:	
Annual clay brick production:	36000 crores
Annual FaL-G brick production:	over 300 crores

Nearly 72% of India's power plants are coal based. These power stations alone generate nearly 40 million tons of Fly ash annually. Fly ash causes severe pollution of air and water, and its disposal gobbles up large tracts of land. Well planned programmes for proper management of Fly ash are therefore being undertaken to enhance the use of Fly ash in various applications, so that our already perilously imbalanced environment can be protected.

Fly ash Utilization in India

Bricks, Portland pozzolana cement, blocks, tiles, light weight aggregates and hollow blocks are produced by utilizing fly ash as raw material. Mechanized manufacture of fly ash lime bricks is a major thrust area. The twofold aim is to utilize bulk quantities of fly ash and help bridge the huge shortfall of bricks and other building materials required by the constantly rising construction activity.

Fly Ash Bricks

Fly ash bricks are made up of fly ash, sand and cement. In these bricks fly ash is used as the primary filler and sand is added as secondary filler. Cement is used to binder, which helps in holding all the raw material together. Fly ash bricks can be extensively used in all building construction activities similar to that of common burnt clay bricks. The fly ash bricks are comparatively lighter in weight and stronger than common clay bricks. Since fly ash is being accumulated as waste material in large quantity near thermal power plants and creating serious environmental pollution problems, its utilization as main raw material in the manufacture of bricks will not only create ample opportunities for its proper and useful disposal but also help in environmental pollution control to a greater extent in the surrounding areas of power plants. In view of superior quality and eco-friendly nature, and government support the demand for Fly Ash Bricks has picked up.

Keeping in view the environmental degradation caused by using fertile clay to manufacture burnt clay bricks and in order minimize the environmental degradation caused by enormous fly ash generation, fly ash bricks grants a mass utilization of the material by allowing 75% of fly ash usage. Based on the raw material, fly ash bricks can be mainly grouped into two categories:

- Fly ash bricks using cement as a binder: Raw materials include: **fly ash, cement and sand.**
- Fly ash brick using lime as a binder: Raw materials include: **fly ash, lime gypsum and sand.**

The Production Process

The production process of fly ash bricks comprises of mixing the raw materials using the pan mixer for 4-5 minutes and then transfers the material to pressing machine with the help of conveyor belt. The compressed blocks are then transferred to a curing yard with the help of wooden pallets on which the blocks are pressed using the press machine. The blocks are then water cured for minimum 14 days. After 14 days of curing, bricks are kept for 7 days in dried place, after that it is ready for sale. The composition of a typical Fly Ash Cement Brick is:

- Fly ash 50-70%
- Sand 20-30%
- Cement 8-12%

Properties and Advantages of Fly ash Bricks

- Fly ash Bricks are grey in colour. They are solid and have plane rectangular faces with parallel sides and sharp straight and right-angled edges.
- Energy efficient: As burning is not involved in the production process, it requires much less energy than burnt bricks.
- Durable: High compressive strength (100-150 kg/m2), low water absorption, negligible efflorescence, less abrasion, less shrinkage.
- Cost efficient: About 10-20% cheaper than burnt clay bricks
- High quality: Uniform shape and size, shaper edges and corners
- FaL-G bricks and blocks are alternative building materials to the traditional burnt clay bricks and are substitutes to the traditional burnt bricks used for construction.
- The manufacturing processes of bricks broadly consists of three operations viz. mixing the ingredients, pressing the mix in machine and curing the bricks for stipulated period.
- In presence of moisture, fly ash reacts with lime at ordinary temperature and forms a compound possessing cementitious properties. After reactions between lime and fly ash, calcium silicate hydrates are produced which are responsible for the high strength of the compound.

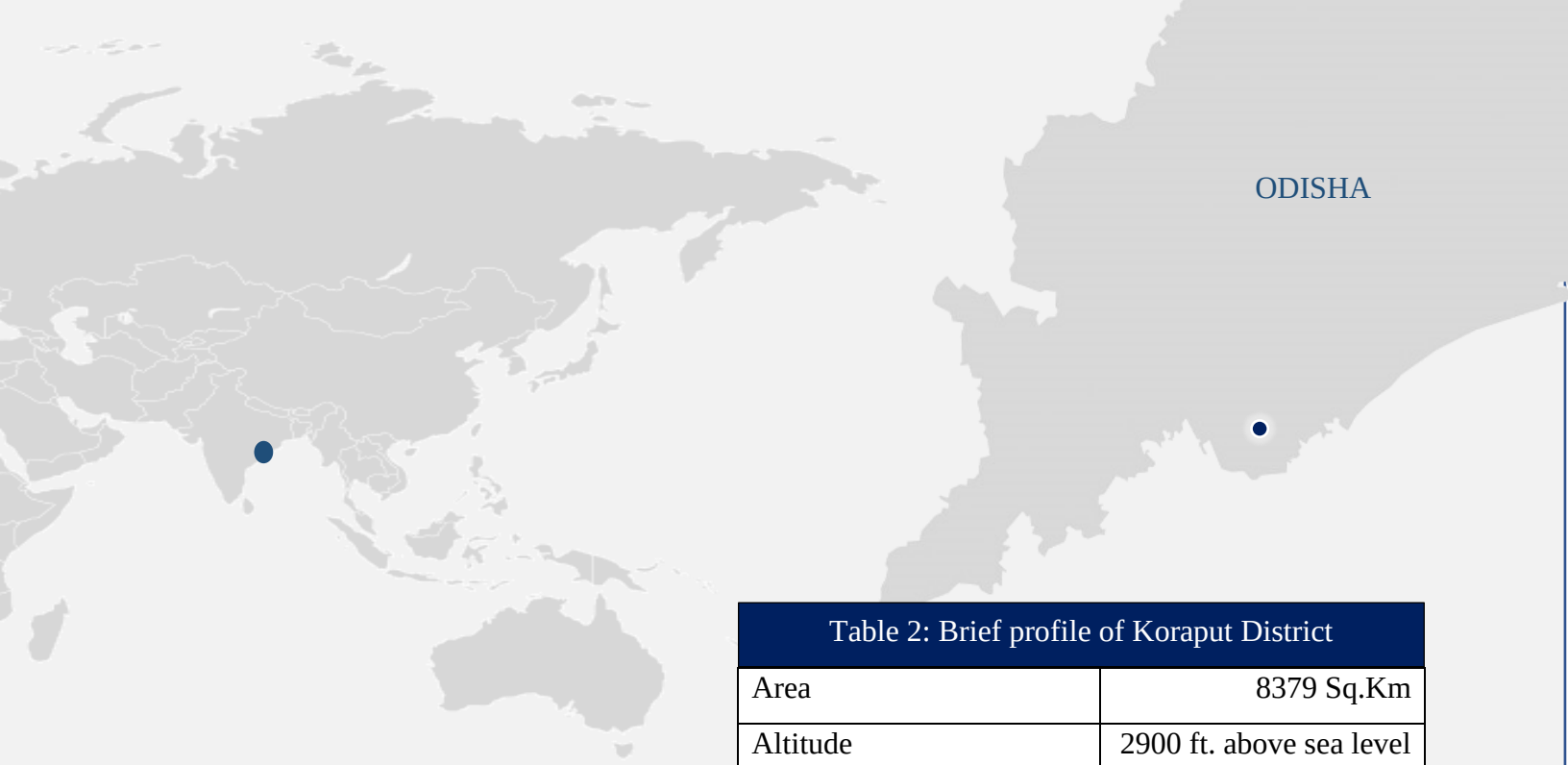
- Production process of FaL-G bricks and blocks does not involve sintering and thus completely eliminates the burning of fossil fuels as required in the clay brick production, ultimately contributing to the reduction of greenhouse gas emissions.
- The technology adopted for making fly ash bricks is eco-friendly. It does not require steaming or auto calving as the bricks are cured by water only. Since the firing process is avoided, there are no emissions and no effluent is discharged.
- The excellent engineering property and durability of fly ash brick enlarges its scope for application in building construction and development of infrastructure, construction of pavements, dams, tanks, under water works, canal lining and irrigation work etc.
- The growing demand for fly ash bricks has prompted Visakhapatnam-based Eco Sphere Building Materials Private Limited to set up a large scale high-capacity automation fal-g bricks manufacturing unit in the city at an invest of about Rs 10 crore.

Areas of Application and Market Potential

Fly ash cement brick technology can be adopted by small scale building material producers or civil contractors and builders. It will be highly economical in areas close to thermal power plants. It can be used for almost all the application where burnt clay bricks are used. Can be used as masonry units in:

- Housing: Residences/shops,
- Factories/workshops,
- Institutional buildings
- Commercial buildings
- Frame structures, compound/boundary walls
- Pavement material

The country consumes about 180 billion tones bricks, exhausting approximately 340 billion tons of clay every year and about 5000 acres of top soil land is made unfertile for a long period. The Government is seriously concerned over soil erosion as a result of production of massive quantities of bricks, in the background of enormous housing needs. The excellent engineering property and durability of fly ash brick enlarges its scope for application in building construction and development of infrastructure, construction of pavements, dams, tanks, under water works, canal lining and irrigation work etc. An enormous quantity of fly ash is available in and around thermal power stations in all the states. The demand of bricks could be met by establishing small units near thermal power stations and to meet the local demand with less transportation costs.



Fly Ash Cluster in Koraput District

Undivided Koraput is one of the districts in KBK region of Orissa. The district was formed in 1994. Koraput is one among the disadvantaged districts in the country. The district has a total geographical area of 8379.0 Sq. Km and a population of 11,77,954. The district is predominantly rural. Nearly 63% of the population belongs to Scheduled Caste and Scheduled Tribe communities. The literacy rate is 36%. The district has the presense of some of major and medium industrial units such as, Hindustan Aeronautic Ltd., at Sunabeda (Product-Aero Engine), National Aluminums Co. at Damanjodi (Product-Aluminums), Ballarpur Industries, Jeypore (Product-Paper). Other industries are Utkal Oil Ltd., Ambaguda (Closed) B.T.W. industries, Ampavalli (Product-Portland Cement) and Jameel Lime and Chemicals, Chandili (Product-Lime). Apart from the above, there are 1734-SSI units in Small Scale Sector. There are two functional industrial Estates at Jeypore and Sunabeda with 4 & 6 sheds respectively (all occupied).

Table 2: Brief profile of Koraput District	
Area	8379 Sq.Km
Altitude	2900 ft. above sea level
Population	11,77,954
Average Rainfall	1522mm
Climate	
Minimum	12 .0 CC
Maximum	38.0 CC
Latitude	17.4^{o}N to 20.7^{o}N
Longitude	81.24.4^{o}E to 84.2^{o}E
Total Population	11,77,94
Total Male Population	589,438
Total Female Population	588,516
Percentage of Literacy	36.20%
Percentage of Male Literacy	47.58%
Percentage of female Literacy	24.81%
Literates (Male)	234,292
Literates (Female)	122,129
Total Literates	356,421
ST Populations	50.66%
SC Population	13.41%

Fly Ash Cluster in Koraput: The Situation Analysis

- Clay Brick production is one of the entrepreneurial activities in the district. Recently, with the availability of fly ash and technological support, Fly Ash Brick units were started in this district.
- There are 11 registered fly ash brick units working in the district in the district. These units have started functioning since last 5 to 10 years.
- The investment in the units ranged from Rs. 600000 to Rs. 3000000
- The number of people employed in each unit ranged from 7 to 35
- Entrepreneurs source the Fly ash from Bellarpur Industries located in this district. Since fly ash is an industrial wastage, the material is freely available. Some of the entrepreneur's source fly ash from Andhra Pradesh also.
- The other raw materials used for producing fly ash bricks are Gypsum, lime powder which are also freely available from fertilizer producing companies
- Fly ash brick units are facing intense competition from clay brick units in the district
- Technical support is available for production of quality brick
- Most of the units are able to produce bricks as per customers requirements
- Skilled laborers are available locally
- Provides employment to local people

Key Stakeholders of the Cluster

- **Lime powder suppliers:**

Lime powder is a raw material for these bricks. These products are mainly coming from mines and lime power processing industries.

- **Fly Ash suppliers:**

It is the primary raw material of this process and these are coming from paper mills as a free product.

- **Gypsom Suppliers:**

It is also a raw material for production of Fly ash bricks. Generally, they are getting this from fertilizer companies like PPL and Coramandal fertilizers.

- **District Industries Center:**

District Industries Center facilitates the registration of these units and also provides subsidies under various schemes. It also recommends for financial assistance from Banks and other formal financial institutions.

- **Banks and other financial institutions**

Almost all the fly ash makers (units) have received financial assistance from the local Banks and other financial institutions.

- **Machinery suppliers**

Generally, all these industries are using automated brick machines and besides that they are also using water pumps, power generators etc. So, they are the stake holders of this process. Mostly the machineries are purchased from Vishakapatanam of Andhra Pradesh and Raipur of Chttishghar.

- **Transport agencies**

The transport agencies play a key role in marketing, they dump the bricks to the destination of builders.

Analysis of Business Operation

Bricks are prepared with using fly ash, lime, sand and gypsum, the producers used to get the raw materials like fly ash from Jeypur paper mill, Lime from Ampavalli, gypsum from visakhapatnam and sand from the local area. They used to take 60 Kg of fly ash, 15 Kg of lime, and 15 Kg of sand and 10 Kg of gypsum as ingredient for the mix. After pressing these bricks are dried for two days in shade, cured in water for 2 days and keep out side for 2 days, which increased the strength of the brick. Then the bricks are ready for selling. Approximately the production cost goes to Rs. 1.40 and sold at Rs. 1.60 in the market. While getting all the raw materials from different places the producers used to spend more money to transporting. For example, the cost of one truck of lime is Rs. 2400/- but the transportation cost is quite high. The normal size of the brick is 3 X 4 X 9 inches in nature. The producers used to pay Rs. 125/- for making of 1000 number of bricks.

1. Brief Profile, Major Strengths and Issues facing the Units	
Name of the unit	**THD Brick Unit**
Location of the Unit	Damonjodi
Name of the Proprietor	Gajendra Das
Contact Phone	9437181332
Nature of the unit	Sole Proprietorship
Date of Establishment	January 2005
Total Investment	Rs 600000
Major products	Fly ash Bricks
Sourcing of raw material	75 % locally, 25 % from Vishakapatanam

Major strength of the unit

- Ability to customize products with customer preference
- Building located in own land
- Permanent building and infrastructure
- Keeping updated record of

Major issues facing the unit

- Lack of customer preference due to brown color
- Low price realization and low margin from the business
- Inadequate credit facilities
- Inadequate market information
- Competition from unregistered brick units in the district
- Sourcing of raw material due to high transport cost
- Inadequate and irregular power supply

2. Brief Profile, Major Strengths and Issues facing the Units	
Name of the unit	**Maa Bhairabi Fly Ash Bricks**
Location of the Unit	Takua, Jaypore
Name of the Proprietor	L. N. Patra
Contact Phone	06854241100
Nature of the unit	Sole Proprietorship
Date of Establishment	June 2003
Total Investment	Rs 800000
Number of people employed in the unit	12
Annual Turnover	Rs. 28000000

Major strength of the unit

- Own building
- Skilled labour
- Ability to customize products with customer preference

Major issues facing the unit

- High transport cost of raw material
- Inadequate credit facility
- Difficulty in selling the products
- Inadequate power supply

3. Brief Profile, Major Strengths and Issues facing the Units	
Name of the unit	**Fair Fly Ash Products**
Location of the Unit	Near Sew Paper Mills, Jaypore
Name of the Proprietor	Nimbi Charan Das
Contact Phone	9437123433
Nature of the unit	Sole Proprietorship
Date of Establishment	2002
Major Products	Fly Ash Bricks
Total Investment	Rs 2200000
Number of people employed in the unit	35
Annual Turnover	Rs. 6000000

Major strength of the unit

- Quality products
- Ability to customize products with customer preference
- Enterprise is situated in industrial estate
- Permanent building
- Updated records

Major issues facing the unit

- High transport cost of raw material
- Low price of products
- Competition from illegal red brick manufacturing units

4. Brief Profile, Major Strengths and Issues facing the Units	
Name of the unit	**Bajrang industries**
Location of the Unit	Dumuriput, Jaypore
Nature of the unit	Sole Proprietorship
Date of Establishment	2005
Total Investment	Rs 800000

Major issues facing the unit

- Limited skill of labourers
- Inadequate power supply

5. Brief Profile, Major Strengths and Issues facing the Units	
Name of the unit	**Build Well**
Location of the Unit	Kankobija, Jaypore
Nature of the proprietor	Mr. K. Krishna
Contact phone no	9437123623
Date of Establishment	2005
Total Investment	Rs 800000
Major Product	Fly Ash Brick
No of persons employed	28
Nature of Business	Sole proprietorship
Annual turnover	Rs. 4000000

Major strengths of the unit

- Quality products
- Ability to customize products
- Skilled labourers
- Permanent infrastructure

6. Brief Profile, Major Strengths and Issues facing the Units	
Name of the unit	**Gupteswar Fly Ash Bricks**
Location of the Unit	Semiliguda
Nature of the proprietor	Mr. L.N. Patra
Date of Establishment	2005
Total Investment	Rs 3000000
Major Product	Fly Ash Brick
Annual turnover	Rs. 6000000
No of persons employed	25

Major strength of the unit

- Quality products
- Entrepreneurial spirit of the owner
- Own transport business and is able to bring synergy in the business

Major strength of the unit

- Maintenance of machinery
- Inadequate power supply
- Lack of public acceptance of the product
- Difficulties in selling the products

The SWOT Analysis of the Cluster

Strengths	Weakness
• Suitable Location • Availability of raw materials • Using automated brick making machines • Good Quality Products • Easy loan availability for this business • Availability of skilled labourers • Large quantity of production • Ability to Customize products according to customer's need • Technical Support	• Lack of awareness among general public towards fly ash-based products • Need to transport fly ash over long distance for use, escalates the cost of the finished product. • Inadequate market Demand • Still clay bricks in the market • Inadequate support as a SSI • Public apprehensions about fly ash bricks
Opportunity	**Threats**
• Potential to increase market Demand • Potential to set up new units • Availability of technology and subsidies under various schemes • More employment generation • Product diversification • Other stake holder's business increase • High margin	• No concrete policy for the utilization of fly ash by the Government • Absence of fair co-operation by the user in public sector/Government agencies for promotion of fly ash brick in their own construction • Lack of awareness among general public towards fly ash-based products • Industry can close down • Competition from Clay bricks units

Major Constraints Facing the Units

- There is no strict follow up of government directions on the utilization of fly ash in the district
- Lack of proper co-operation, and collaboration of the manufacturers and government departments for promotion of fly ash brick in all government construction works
- Inadequate awareness about the fly ash products and limited popularity of fly ash-based products
- High cost of transportation of fly ash to the production site, and escalation of cost of the finished product
- Fewer margins to the producer from the selling price
- Difficulty in finding market for the product

Recommendations

- Fly ash brick should become one the thrust area of the government for the rural employment and infrastructure development and also to ensure enhancement and toughness of constructions in the rural areas.
- Poularization and advocacy on Eco-Friendly Fly ash-based products.
- Tax exemptions as per the guidelines of The M.o.E.& F in their letter dated 27.05.1996 for initial five years.
- Simplification and single window clearance for the sanction of production units.
- Power supply at subsidized rates for the entrepreneurs to set up fly ash product units.
- Establishment of linkage with formal financial institutions for credit access.
- An urgent need to set up a committee to study the role of nodal agency with following objectives.

    - Exposure and orientation for product diversification,
    - To improve the use of Fly ash bricks in various building activities and other uses of Fly ash.
    - Control on open kiln of fire burn mud bricks.
- A resource center to extend handholding support to deal with the problems faced by the manufacturers and users of Fly ash-based products and developing strategies for the management of fly ash.
- Capacity building of local community to ensure quality products and develop efficiency.
- Policy back up and strict follow up of the government to utilize Fly ash products in al is construction programmes.

Action Plan for the Cluster

Organising Entrepreneurship Development Programmes: It is proposed to organize a series of entrepreneurship development programmes benefiting all potential entrepreeures in the district. The entrepreneurship development programmes should have strong focus on the following aspects:

- Awareness creation on Fly ash utilization, technologies available for production of fly ash products, government directions in usage of fly ash and fly ash products, etc.
- Awareness creation on various schemes and programmes available with various government departments, banks and financial institutions, information with regard to various government programme, qualification, criteria for selection, mode of assistance, etc should shared in the awareness creation workshops
- Business skill development workshops: The business skill development workshops should focus of various facets of business operation including training on operation of machineries, maintenance, business opportunities identification, identification of markets, mobilization of finance and marketing, maintaining of records, accounts etc.

Provision of Business Development Services: Business opportunities in the cluster can be exploited through the provision of business development services. The provision of BDS should adopt a single window approach for facilitating identification of potential entrepreneurs, provision of business counseling, preparation of business plans, facilitating registration of new and existing units, networking with banks and financial institutions etc.

Establishment of Large-scale Manufacturing Units: A large-scale unit for manufacturing of Brick and other fly ash products can be established in the district. The unit can be set up in co-operative sector or under Public Private Partnership mode.

Marketing Support: The future growth of the cluster depends on the exploitation of the potential market. Considering the demand for the products, there exist tremendous unexploited market potential for the products within and outside the state, which can be properly utilized for the future growth and development of the cluster. The provision of marketing services should have a strong focus on the following aspects:

- Provision of market information: Timely market information is a key element in the marketing of the products. A separate infrastructure may be considered for the provision of timely market information to the potential entrepreneurs. The market

information should be focused on price movements of products, demand and supply information, information on potential buyers etc.

- Facilitating a common brand: A common brand name can be considered for the products of the cluster. The common brand name with standard quality specification will help to attract potential customers from within and outside the state.
- Organizing buyer seller meets: In order to facilitate the marketing of the products of the cluster, it is proposed to organize buyer-sellers meets on a regular basis. The buyer-seller meets will help to eliminate the role of middlemen who often act as tentacles exploiting the entrepreneurs.
- Participation in trade fairs and exhibitions: It is proposed to participate in trade fairs and exhibitions organized by industry associations and chambers of commerce and industry.
- Establishment of retail outlets: In order to market the products in the local market, retail outlets can be opened in prime market locations.
- Facilitating networking with potential buyers: It is possible to explore captive market for products with proper networking and negotiations it prospective buyers. The possibility of making it mandatory to use fly ash bricks for construction of housing schemes under rural development programmes, construction of culverts, and other buildings under government contract.

Conclusion

Fly Ash utilization is picking up with the introduction of appropriate technologies and assistance available under fly ash utilization programme of government. Production of Fly ash bricks is one of the viable options for fly ash utilization. There exists a huge market for bricks in urban areas as well as rural areas. The environmental issues such as soil erosion and declining fertility of the soil due to exploitation of top soil for production of clay bricks had resulted enormous public outcry on regulating the production of burnt clay products. The availability of fly ash coupled with its relative advantage over clay products make it a suitable building material. It requires massive awareness creation for bringing the relative advantage of fly ash brick over clay products and to bring public confidence in fly ash brick products. The developmental intervention in fly ash cluster should focus on bringing public confidence in the product along with other business development support required for the development of the cluster. The cluster has the potential for growth in coming years with focused attempt in bringing investment from within and outside the district.

Appendix I
SME Interview Format

General Instructions

1. Start your study with a tour of the production/storage facilities of the unit
2. Start your discussion keeping the following format in mind

1	Date of Visit				
2	Name of Enterprise				
3	Name and Position of the Respondent				
4	Location				
5	Main product(s) of the Enterprise				
6	How many people are employed (Including Owners)				
7	Estimated total investment (Excluding land/buildings rented by the enterprise)				
8	Form of the enterprise (Sole proprietorship, partnership, family business, company etc.)				
9	Date of establishment				
10	Any other business fully or partly owned by the owners				
11	Where are the products sold (Volumes are to be calculated annually)?				
		Name of the market			
		Product 1 (Volume)			
		Product 2 (Volume)			
		Product 3 (Volume)			
		Product 4 (Volume)			
		Product 5 (Volume)			
		Others (Volume)			
12	How does the state of business of the enterprise differ from younger units				

13	How does the state of business of the enterprise differ from other units established in the same year of establishment			
14	What are the other business which have important business relations with the enterprise			
15	Marketing channels used by the enterprise			
		Dealers		
		Carrying and Forwarding agents		
		Wholesalers		
		Retailers		
		Direct Marketing		
16	Apart from orders, what are the other things provided by these channels	Market intelligence		
		Design support		
		Market requirements		
		Technical assistance		
		Credit in money or materials		
17	What are the main product features used to attract customers (quality, customizing to customers' needs, quick delivery, advertising, price etc.)			
18	Is the emphasis shifting from one product feature to the other? Describe.			
19	Does enterprise require any kind of aid to enhance its business? If yes, then had it received any such aid in past. (Note the names and addresses of the aid providers.)			
20	Was it required to pay to get any such aid			
21		Selection		
		Quality		

	What are the enterprise's main problems in marketing	Price	
		Design	
		Transport cost	
		Lack of credit	
		Lack of market information	
		Others	
22	Who are the enterprise's main competitors (Note their names and addresses)		
23	Developments in the last 3 years		
24	What are the enterprise's future plans of up gradation /diversification /expansion		
25	Is the enterprise situated in an industrial estate? If yes, then who is the developer (small industry agency, local authority, SSI association, private party etc.)		
26	What are the other services, if any, provided to the enterprise by the developer		
27	Is the premise temporary		
28	From where, the enterprise has purchased its machines		
29	What is the average age of machines		
30	Who advised it to buy these machines (Note the names and addresses of the advisors)		
31	Who provides parts, servicing and repair services? Are they general mechanics or specialists in these types of equipments?		
32	What are the main problems with these equipments		
33	What are the main problems with the production processes		
34	Does the enterprise maintain a record of upgrading/diversifying its products/ processes		
35	Does the enterprise specialize in one or two stages of a production process? (If the specialization is significant, then note the		

	names and addresses of customers, specialist suppliers and common service facilities)	
36	Does the enterprise rely on other SMEs for supplies	
37	Is the specialization helpful for its business?	
38	Where did the owners/suppliers receive their basic training (Note the names and addresses of the training organizations / people)	
39	Does the enterprise maintain a record of all the training programs that its employees attend	
40	Does the enterprise feel significant problems with the existing level of skills of its employees	
41	Is the enterprise using any other source to train its employees? (Note the names and addresses of the training providers)	
42	What are the principal sources of raw materials? Are they local?	
43	Can the raw material suppliers offer any advice on the choice/use of raw materials	
44	What kind of technical support is provided by the suppliers	
45	What are the problems that the enterprise is facing from suppliers' side	
46	Has the enterprise received any help to resolve any such issues? (Note the names and addresses of the help providers)	
47	How was the enterprise funded in the beginning?	
48	How is the enterprise funded now?	
49	What kinds of credits does the enterprise receive? (Note the names and addresses of the creditors)	
50	What was the size of the credits received	
51	What was the rate of interest	
52	What is the date of the most recent credit	

53	Has the enterprise used third party services for securing external credit (Note the names and addresses of the service providers)		
54	Is the enterprise generating profits after considering all business costs including the income of owners		
55	What is the rate of increase of profit over the years for the enterprise		
56	Where do owners invest their profits	What form of expansion	
		Which another sector	
		What type of investment	
		What are the reasons for such investments	
57	What are the enterprise's main problems with finance		
58	What are the main sources for the enterprise to get infrastructure support	Electricity	
		Phone/fax/Internet	
		Water	
		Transport	
		Waste disposal	
		Effluent treatment	
		Fuel	
59	Has the enterprise received any cooperation from other SMEs in getting infrastructure support (Note names and addresses of all such cooperating SMEs)		
60	What are the infrastructural problems that the enterprise is facing today		
61	Describe the most serious problem, if any, that the enterprise has with laws and regulations		
62	Who has advised the enterprise to solve problems related to laws and regulations (Note names and addresses of the advisors)		

63	Is the enterprise a member of any business association? Note the name and place of the association.	
64	How long the enterprise has been the member of the association	
65	What kinds of services the enterprise has received from the association	
66	How are the services offered by the association to the enterprise financed	
67	How useful are the services provided by the association	
68	What are the steps that can be taken to improve the services provided by the association	

Problem-1	
Problem-2	
Problem-3	

Core Competitive Strategy	
Core Strength	
Most valuable interaction	

Appendix II

MINISTRY OF ENVIRONMENT AND FORESTS

NOTIFICATION

New De1hi, the 27th August 2003.

S.O. 979 (E):- Whereas a draft of certain amendments to the Government of India in the Ministry of Environment and Forests notification number S.O.763 (E) dated 14th September, 1999 (hereinafter referred to as the said notification) which the Central Government proposes to make under sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) dated the 6th November, 2002 *vide* S.O. 1164 (E), dated the 5th November, 2002 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of sixty days from the date on which copies of the Gazette containing the said draft amendments were made available to the public.

And, whereas copies of the said Gazette were made available to the public on 27th November 2002;

And, whereas all the objections and suggestions received from all persons likely to be affected thereby in respect of the said draft notification have been duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following amendments to the said notification, namely: -

AMENDMENTS

1. In the said notification, in the preamble, for the words "fifty kilometers", the words "one hundred kilometres" shall be substituted.
2. In the said notification, in paragraph 1, -
   (a) in sub-paragraph (1), for the words "fifty kilometers", the words "one hundred kilometres" shall be substituted;

(b) after sub-paragraph (1), the following sub- paragraphs shall be inserted, namely: -
"(1A) Every construction agency engaged in the construction of buildings within a radius of fifty to one hundred kilometers from a coal or lignite based thermal power plant shall use fly ash bricks or blocks or tiles or clay fly ash bricks or cement fly ash bricks or blocks or similar products or a combination or aggregate of them in such construction as per the following minimum percentage (by volume) of the total bricks, blocks and tiles, as the case may be, used in each construction project, namely:-

(i) 25 per cent by 31st August 2004;
(ii) 50 per cent by 31st August 2005;
(iii) 75 per cent by 31st August, 2006; and
(iv) 100 per cent by 31st August 2007.

In respect of construction of buildings within a radius of 50 kilometres from a coal or lignite based thermal power plant the following minimum per centage (by volume) of use of bricks, blocks and tiles shall apply: -
50 per cent by 31st August 2004;
100 per cent by 31st August 2005.

(1B) The provisions of sub-paragraph (1A) shall be applicable to all construction agencies such as Housing Boards and those in the private sector builders of apartments, hotels, resorts and cottages and the like. It shall be the responsibility of the construction agencies either undertaking the construction or approving the design or both to ensure compliance of the provisions of sub-paragraph (1A) and to submit such returns as may be called for and compliance reports to the State Government or Union territory Administration";

(c) for sub-paragraph (2), the following sub-paragraphs shall be substituted, namely: -
" (2) The authority for ensuring the use of specified quantity of ash as per sub-paragraph (1) shall be the concerned Regional Officer of the State Pollution Control Board or the Pollution Control Committee, as the case may be.

(2A) The concerned State Government shall be the enforcing and monitoring authority for ensuring compliance of the provisions of sub- paragraph (lA).";

(d) in sub-paragraph (3), for the words, brackets and figure "under para (1)" the words, brackets and figure "under sub-paragraph (1)" shall be substituted;

(e) after sub-paragraph (3), the following sub-paragraphs shall be inserted, namely: -
"(3A) A decision on the application for manufacture of fly ash bricks, block, and tiles and similar other fly ash-based products shall be taken within thirty days from the date of receipt of the application by the competent authority. A decision on consent to establish the brick kiln shall be taken by the Pollution Control Board or the Pollution Control Committee, as the case may be, within a period of thirty days from the date of receipt of application by it.

(3B) In case of non-compliance of the provisions of sub-paragraph (1) of paragraph 1, the competent authority, in addition to cancellation of consent order issued to establish the brick kiln, shall move the district administration for cancellation of the mining lease.

(3C) All authorities sanctioning or renewing any land, soil or clay mining lease shall not grant such lease or extension of lease or renewal to clay brick, block or tile manufacturing unit within a radius of one hundred kilometres of the coal or lignite based thermal power plant in cases where the manufacturer does not mix a minimum of 25 per cent by weight of fly ash or pond ash in the manufacture of bricks or blocks or tiles. The cancellation of mining lease shall be decided by the district administration after giving the holder of such lease an opportunity of being heard. To enable the competent authority to verify the actual use of ash, the thermal power plant shall maintain month-wise records of ash made available to each brick kiln.

(3 D) It shall be sufficient compliance of this notification if within twelve months from the date of issue of this notification, manufacturers of clay bricks, blocks and tiles located within a radius of 50 to 100 kilometres of a coal or lignite based thermal power plant comply with the provisions of sub-paragraphs (1) and (2).".

(f) in sub-paragraph (4), after brackets and letters "(AIBTMF)", the words "or a representative of local brick kiln owners association, federation, group." shall be inserted;

(g) after sub-paragraph (4), the following sub-paragraphs shall be inserted, namely: -

"(5) No agency, person or organization shall, within a radius of 100 kilometres of a thermal power plant undertake construction or approve design for construction of roads or flyover embankments in contravention of the guidelines/ specifications issued by the Indian Road Congress (IRC) as contained in IRC specification No. SP: 58 of 2001. Any deviation from this direction can only be agreed to on technical reasons if the same is approved by Chief Engineer (Design) or Engineer-in-Chief of the concerned agency or organization or on production of a certificate of "Pond ash not available" from the thermal power plant(s) (TPPs) located within 100 kilometres of the site of construction. This certificate shall be provided by the TPP within two working days from the date of making a request for ash.

(6) Soil required for top or side covers of embankments of roads or flyovers shall be excavated from the embankment site and if it is not possible to do so, only the minimum quantity of soil required for the purpose shall be excavated from soil borrow area. In either case, the topsoil should be kept or stored separately. Voids created due to soil borrow area shall be filled up with ash with proper compaction and covered with topsoil kept separately as above. This would be done as an integral part of embankment project within the time schedule of the project.

(7) No agency, person or organization shall within a radius of 100 kilometres of a coal or lignite based thermal power plant allow reclamation and compaction of low-lying areas with soil. Only pond ash shall be used for compaction. They shall also ensure that such reclamation and compaction is done in accordance with the bye-laws, regulations and specifications laid down by the authorities mentioned in sub-paragraph (3) of paragraph 3.".

3. In the said notification, in paragraph 2,

(a) for the marginal heading **"Utilisation of ash by Thermal Power Plants"**, the marginal heading **"Responsibilities of Thermal Power Plants"** shall be substituted;

(b) for the opening words, "All coal or lignite based thermal power plants shall utilise the ash generated in the power plants as follows: -", "Every coal or lignite based thermal power plant shall take the following steps to ensure the utilisation of ash generated by it, namely: -";

(c) in sub- paragraph (1), -

(i) after the words "products such as cement, concrete blocks, bricks, panels", the words "or a combination thereof" shall be inserted; the following shall be added at the end, namely: -

(ii) " The thermal power plants have to ensure availability of fair quantity of ash to each user including brick kilns.";

4. In the said notification, after paragraph 2, the following paragraph shall be inserted, namely: -

"2A. Utilization of fly ash for reclamation of sea.

"Subject to the rules made under the Environment (Protection) Act, 1986, (29 of 1986) reclamation of sea shall be a permissible method of utilization of fly ash.".

5. In the said notification, in paragraph 3, the following sub-paragraphs shall be inserted, namely: -

"(2A) All agencies including the Central Public Works Department and State Government agencies concerned with utilization of fly ash for construction purposes shall, within three months from the 1st day of September, 2003 make provisions for the use of fly ash and fly ash-based bricks, blocks or tiles or aggregates of them in the schedule of approved materials and rates.

(2B) All agencies undertaking construction of roads or fly over bridges including Ministry of Road Transport and Highways (MORTH), National Highways Authority of India (NHAI), Central Public Works Department (CPWD), State Public Works Departments and other State Government Agencies, shall, within three months from the 1st day of September, 2003 -

(a) make provisions in their tender documents, schedules of approved materials and rates as well as technical documents, including those relating to soil borrow area or pit as per sub-paragraph (7) of paragraph 1; and

(b) make necessary specifications/guidelines for road or fly over embankments that are not covered by the specifications laid down by the Indian Road Congress (IRC).".

[F.No.16-2/95-HSMD]
(Dr. V. Rajagopalan)
Secretary to the Govt. of India

Footnote. - The principal notification was published in the Gazette of India, Part II, Section 3, sub-section (ii) *vide S*.O.763 (E) dated 14.9.1999.

Letter from **Ministry of Road Transport and Highways (MoRT&H)** to all its Secs/Chief engineers, NHAI, DG – border roads

GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT & HIGHWAYS

Transport Bhavan

No.1, Parliament Street
New Delhi – 110 001

No.RW/NH-33044/30/2001-S&R® Dated, the 4th December 2003

To

1. The Secretaries of States/Union Territories, Public Works Department (Dealing with National Highways)
2. All Chief Engineers of States/Union Territories (Dealing with National Highways)
3. The Chairman, National Highway Authority of India, G-5 & G-6, Sector-10, Dwarka, New Delhi – 110 045
4. The Director General (Border Roads), Seema Sadak Bhawan, Ring Road, Delhi Cantt., New Delhi – 110 010

Sub : Use of Fly Ash in Road / Flyover Embankment Construction-Amendment to Clause 305 of the Ministry's Specifications for Road and Bridge Works (Fourth Revision) 2001.

Sir,
In continuation to the Ministry's letter of even no. dated 30th July, 2003 forwarding thereby the amendments to the Clause 305 "Embankment Construction" of the Ministry's specifications for Road and Bridge Works (Fourth Revision), 2001 along with a list of Thermal Power Plants generating Fly / Pond Ash in different States, it is stated that Ministry of Environment & Forests, Government of India vide notification No.S.O. 979(E) dated 27th August, 2003 published in the Gazette of India, Part-II-Section 3-Sub-Section (ii) (copy enclosed) has made use of Fly/Pond Ash compulsory in road embankment construction. Sub paragraph (g) of paragraph 2 of the notification at page 10 makes the following amendments:

'No agency, person or organisation shall, within a radius of 100 kilometres of a thermal power plant undertake construction or approve design for construction of roads or flyover embankments in contravention of the guidelines/specifications issued by the India Road Congress (IRC) as contained in IRC specification No.SP:58 of 2001. Any deviation from this direction can only be agreed to on technical reasons if the same is approved by Chief Engineer (Design) or Engineer-in-Chief of the concerned agency or organisation or on production of a certificate of "Pond Ash Not Available" from the thermal power plant(s) (TPPs) located within 100 kilometres of the site of construction. This certificate shall be provided by the TPP within two working days from the date of making a request for ash'.

2. Further, vide Sub paragraph (2B) of paragraph 5 at page 13 of the notification, all agencies undertaking construction of roads or flyover bridges including Ministry of Road Transport & Highways (MoRT&H), National Highways Authority of India (NHAI), Central Public Works Department (CPWD), State Public Works Departments and other State Government Agencies, shall within three months from the 1st day of September, 2003-

a. make provisions in their tender documents, schedules of approved materials and rates as well as technical documents, including those relating to soil borrow area or pit as per sub-paragraph (7) of paragraph 1; and
b. make necessary specifications/guidelines for road or flyover embankments that are not covered by the specifications laid down by the Indian Road Congress (IRC).

3. In compliance to above, in second part of Para 2 of the Ministry's letter of even number dated 30th July, 2003 referred above, the words 'economically viable lead' stand substituted as 'a radius of one hundred kilometres of a thermal power plant'.

4. It is, therefore, requested that the requisite amendments may please be carried out at the appropriate places and complied strictly.

5. It is requested that quarterly 'Action Taken Report' on use of fly/pond ash in road/flyover embankment construction on NH/other centrally sponsored works in your State/Organization may please be forwarded to the Ministry addressed to Shri S.S. Nahar, SE® S&R, Room No.340, Transport Bhavan, 1, Parliament Street, New Delhi – 110 001.

Yours faithfully,

(G.SHARAN)
Chief Engineer (Roads) S&R
For Director General (Road Development)& Special Secretary

Copy along with the enclosures to:

1. All Technical Officers in Head Quarter
2. All Ros / ELOs
3. Secretary IRC, Jam Nagar House, Shahjahan Road, New Delhi
4. Director NITHE, Noida (U.P.)
5. Adviser, Ministry of Environment and Forests, HSM Division, Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi – 110 003. This has a reference to your letter No.16-1/99-HSMD dated 17th September 2003

(G.SHARAN)
Chief Engineer (Roads) S&R
For Director General (Road Development) & Special Secretary