Welcome to
Dignitaries & Delegates
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Session III
Green Ratings Project findings and status of regional power plants

Fly Ash Utilisation: Opportunities & Challenges

June 17, 2015

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Typical Clay Brick Activity
Clay brick production is one of the energy-intensive activity due to thermal energy required for sintering operations. On an average, each one million clay bricks consume over 260 tons of coal, or equivalent fuel belching unprocessed flue gases as well as over 380 tons of CO2.
Base Line: Clay Brick Activity:

- Fast depletion of fertile lands near urban centre compels clay brick manufacturers to drift to farther places.
- Lease cost for lands with good quality clay is increasing day by day, forcing the manufacturers to compromise on quality of clay.
- Standards of sintering temperature of kilns is compromised due to spiraling costs of coal and other fuels.
- Clay brick price is linked to landed cost. Thus, farther the clay brick activity from demand zones, higher is the transport cost.
What is FaL-G:

FaL-G is the patented technology (Patent No. 198639) developed by Dr N Bhanumathidas & N Kalidas, for the production of fly ash Bricks and blocks.

Fly ash (the residue of coal combustion in boilers of thermal plants and other process industries) is blended with lime/cement and gypsum to get FaL-G. Sand or stone dust is added as filler.

This technology is being promoted by Institute for Solid Waste Research & Ecological Balance (INSWAREB) and, as of now, over 18,000 plants are working with an aggregate output of over 54 billion bricks (or equal volume of blocks) and turnover of approx. Rs. 21,600 crores, in India.
FaL-G Technology and Features

FaL-G facilitates to consume various industrial byproducts thus avoiding the use of top soil, paving way for sustainable food production by protecting the fertility of agricultural lands. In view of this macro service to mankind, the technology is let loose to be practiced without invoking patent.
Each FaL-G brick plant in tiny sector can absorb 15 workers. About 270,000 workers got livelihood from over 18,000 plants presently working through out India. There is a potential to create work for about 15 lakh workers when 100,000-unit target is accomplished.

In view of year-long activity, FaL-G brick units offer sustainable livelihood to workers, thus avoiding bonded-labour and child-labour.
By replacing the application of clay bricks in the construction segment, both in housing and infrastructure, FaL-G bricks/blocks serve the market with more vividity.
## COMPARISION

<table>
<thead>
<tr>
<th>SINTERED CLAY BRICK</th>
<th>FLY ASH BRICK</th>
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<tbody>
<tr>
<td>Uneven shape as handmade</td>
<td>Uniform in shape and smooth in finish</td>
</tr>
<tr>
<td>Lightly bonded</td>
<td>Dense composition</td>
</tr>
<tr>
<td>Plastering required</td>
<td>No plastering required</td>
</tr>
<tr>
<td>Compressive strength is around 35 Kg/cm²</td>
<td>Compressive strength is around 100 Kg/cm²</td>
</tr>
<tr>
<td>More porous</td>
<td>Less porous</td>
</tr>
<tr>
<td>Water absorption 20-25%</td>
<td>Water absorption 6-12%</td>
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In view of the high strengths feasible with FaL-G, the scope of brick is enlarged from walling to infrastructure applications such as Khadanza pavements, arch dams etc.

By this aspect the scope for fly ash consumption is maximised.

Chennai-Pondy Highway
FaL-G: CDM Project

* FaL-G is energy-free technology abating GHG emissions, thus qualifying for CDM.

* Tiny and small scale plants cannot absorb transaction costs involved in registering their activity as CDM Projects, which is equally applicable to FaL-G units. By utilising the opportunity of ‘Bundling’ even these small units could be benefited out of CDM revenue.
How does FaL-G Technology qualify for CDM

Each one million FaL-G bricks help to:

Conserve 4,500 tons of fertile top soil

Consume 3,700 tons of various industrial byproducts

Conserve 260 tons of coal or equivalent fuel

Abate about 381 tons (241 after leakages) of Carbon dioxide
## Contributions of FaL-G Technology in National Perspective

<table>
<thead>
<tr>
<th>Ministry concerned</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Ministry of Rural Dev.</td>
<td>Conservation of fertile top soil; protecting land for agriculture.</td>
</tr>
<tr>
<td>Ministry of Power</td>
<td>Conservation of coal. To make use of huge quantities of fly ash.</td>
</tr>
<tr>
<td>Ministry of Poverty alleviation</td>
<td>Creation of year-long employment to rural folks.</td>
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</table>
Under Bundling program, Eco Carbon Pvt Ltd., has signed an agreement with The World Bank, the Trustee of Community Development Carbon Fund (CDCF), offering 451,590 Contract ERs. This contract is accomplished 2 years ahead of Schedule.
CHALLENGES
Despite of all these attractions clay brick activity could not be stopped due to strong socio-economic logistics attached as under:

240 billion potential giving a turnover of over Rs. 1200 billion. How much is accounted for? Not even 20%!

Tax regimes are not complied with!

Statutory compliances are not adhered to!

Unaccounted coal encouraging coal mafia!

Unaccounted land cess!
Minutes of meeting held on 7.1.2015 at MoEFCC in response to NGT-direcions

Inclusion for use of fly ash bricks in the environmental clearances to construction projects along with strict monitoring mechanisms is likely to increase the market for fly ash bricks.

Therefore, for the present, restricting the production of red bricks around thermal power plants may not be considered.

It was finally decided that the Minister may consider amending the notification on these lines.
Unless ban on clay bricks is invoked in letter and spirit by Union Government, beyond politico-social considerations, fly ash bricks cannot penetrate.

To facilitate the transition, INSWAREB offered National level training to clay brick manufacturers on FaL-G technology, by addressing letters to Minister of Environment as well as Prime Minister.

Migration of clay brick manufacturers to FaL-G Takes place only when a level-field is offered at par with clay brick activity on taxation and Statutory compliances.
CONCLUSIONS

Fly ash should be made available as easy as clay.

Fiscal incentives should be at par to that of clay brick industry, as enjoyed, though unofficially.

Fly ash brick industry should be accorded National status, for promotion and popularisation.
CONCLUSIONS

The living practices in Rural regions taught Sustainable Development long back much ahead of the scientists coining the word based on maladies of modern living.

If Rural-Infrastructure is protected, with particular reference to roads, water bodies communications, and irrigation facilities, it is possible to protect the rural-social fabric. FaL-G can contribute its mite in this direction.
CONCLUSION

The advancements in material science together with agenda of solid waste utilisation can certainly provide solutions to Sustainable Development.
This is how FaL-G is the technology of Sustainable Development

And could prove as the contributory tool to the Action Plan on Climate Change in India

Thank You for Your Kind Attention