



Objections and Suggestions on
Draft Notification on Fly Ash Dated 6th November 2008
from Ministry of Environment & Forests, Govt. of India

It is nice that, in the preamble, the draft exhorts the need for restricting the excavation of top soil for manufacture of bricks. In addition, in the same preamble, the draft should emphasize on the need to save minerals such as limestone that goes as raw material in production of cement, by rationalizing the input of clinker by complementing with the input of fly ash.

The draft appeared to have been prepared without involvement/inputs of material scientists who have the knowledge of fly ash, cement, concrete and related technologies. Hence certain inputs and refinements are very essential to strengthen the agenda of the notification.

Defining Fly ash:

It is erroneous to bring common connotation to fly ash by clubbing with bottom ash and pond ash vide the explanations given below:

Bottom ash cannot be called as fly ash because bottom ash has no reactivity in the lines of fly ash. Bottom ash is the inert and over burnt fly ash. It also contains unburnt carbon, condensed particles of molten and solidified fly ash and sometimes alkali-rich particles (the alkalis of coal are volatilized at elevated temperatures, there upon condensed into particles at threshold temperature zone and gets mixed up with bottom ash). Thus fly ash gets contaminated by getting mixed up with bottom ash. If somebody sells fly ash by adding with bottom ash, it is tantamount to sell adulterated fly ash which needs to attract punitive measures.

Pond ash is the blend of fly ash, bottom ash and any other unwanted outputs at boilers. Wherever thermal plants located in the coast, pond ash is pumped with sea water contaminating the product. Hence use of such pond ash in the name of fly ash is detrimental to the engineering properties of building materials.

Minimum content of fly ash in various products:

The notification has grossly faulted in specifying minimum % of fly ash by weight in various building materials vide table in clause 1C. As a matter of fact, in the absence of knowledge on material science, there is no need for the draft to define minimum fly ash content, which is the job of codification authorities. To explain the anomaly, very lengthy technical explanations need to be provided on each product cited in the table. However the following explanations try to explain the issues in brief:



Minimum 50% fly ash in brick:

Argument 1:

More the input of fly ash more the need of reactive inputs such as lime and cement, making the product cost prohibitive. If reactive inputs are not commensurate then the portion of fly ash not gone into pozzolanic reaction withers out showing up the poor quality of product.

Argument 2:

The potential for clay brick market is 200 billion by one study and 360 billion by other study. Considering average weight of full size clay brick at 3 kg, at 50% input, the total National output of 150 million tons of fly ash is sufficient for 100 billion bricks. How does MOEF envisage in preventing excavation of top soil for balance of 100 billion bricks, even at the least potential?

Argument 3:

The success of fly ash brick penetrating into clay brick market taken place ever since FaL-G technology came into prevalence, which proved the feasibility of fly ash brick over clay brick on account of total energy-avoidance. FaL-G technology is the most flexible technology to develop the mix in tailor-made conditions depending on fly ash quality, cost and various other logistics. Thus it was proved that, even after mobilising fly ash to 300 km radius, it is possible to produce fly ash brick with an edge over clay brick price. What does it mean?

Wherever fly ash is hauled to long distances the input of fly ash is rationalized. Stone dust (another byproduct of stone crushers) is used as the filler, which helps to offset the costs as well as to achieve workable strengths. So fly ash bricks can be manufactured with fly ash input of 2 kg (66%) per brick to as low as 0.5 kg (16%) input, giving parallel strengths and cost of production. This is the flexibility of FaL-G technology.

If the direction of 50% fly ash persists, fly ash bricks cannot be manufactured beyond logistical radius of 50 km from thermal plant. Then what have we achieved by imposing minimum fly ash content? Do we intangibly permit production of clay bricks beyond 50 km radius?



Argument 4:

Though there are units located at next door to power plants, in the event of plant maintenance and erratic supplies of fly ash, in order to keep the continuity of production, the units change their mix, bringing down the fly ash input per brick, and produce more quantity of bricks within available fly ash. If MOEF insist for specific quantity of fly ash, in the eventuality of scarce supply for fly ash, the units have to stop production giving room for penetration by clay brick vetoing the agenda of top soil erosion.

Argument 5:

Marketability of any product is driven by price logistics. Clay brick price is a localized aspect and the success of fly ash brick lies in keeping price-edge over clay brick. This is possible when the manufacturer would be free to decide his economical mix. Does MOEF desire in promoting 10 billion bricks with more fly ash (1.5 kg) and higher price, or 100 billion bricks at lesser fly ash (0.5 kg) and competitive price? Which is good business sense!

Minimum fly ash content in cement, concrete and precast cement components:

The ratio between cement and fly ash depends on various technical parameters and engineering properties of desired finished products. The quality of fly ash vis-à-vis clinker decides the amount of input in each application. If a good quality fly ash is available, the manufacturer invariably adds more input of fly ash in order to improve the engineering properties and take advantage of costs. In contrary, if the fly ash is of poor quality (say from first field of ESP) the manufacturer cannot afford in spoiling the finished product because of MOEF stipulations.

Percentage of fly ash in a product should not be a parameter to qualify the same as 'fly ash based product'. The table has some technical errors. The word 'Raw materials' is loosely used .which would have been discriminated against inputs. For example, the limestone or fly ash that goes into production of cement are raw materials, whereas, the fly ash that is blended with cement may be identified as input. The words, Fly ash and PPC can not be interchanged in expression. Sincerely we suggest to scrap the table, but give corrections to point out errors in the table but not to endorse its contents:

S.No.	Building Materials or Products	Minimum % of fly ash by weight
1.	Fly ash bricks, blocks, tiles, etc., made with fly ash, lime, gypsum, sand, stone dust, cement, etc. (without clay)	50% of total inputs. *



2.	Paving blocks, paving tiles, checker tiles, mosaic tiles, roofing sheets, pre-cast elements, etc. where in cement is used as binder.	Fly ash should be 20% of cementitious content whether used as PPC or blended with OPC externally.**
3.	Cement.	20% of total Cementitious content.\$
4.	Clay based building materials such as bricks, blocks, tiles etc.	25% of total raw materials.
5.	Concrete, mortar and plaster.	Usage of fly ash should be 20% of total Cementitious content.\$§

* 'Raw materials' are generally subjected for processing to manufacture a finished product. In cement concrete the inputs are blended together to cast a component. Hence they may be identified as 'inputs' in order to discriminate them from raw materials.

** When fly ash is inter-ground with clinker or blended with ground clinker in association with gypsum then it is called PPC. Fly ash can also be added to OPC at site to manufacture fly ash-blended cement components.

\$ Fly ash can be added to cement in two ways; firstly as corrective ingredient to raw materials (generally called as 'raw meal' in cement parlance) before the whole mass is subjected for clinkerisation; secondly as blending input at the time of clinker-grinding. Adding fly ash to raw meal is purely technical and optional subject to the deficiency of limestone to accept the constituents (SiO_2 and Al_2O_3) of fly ash. Hence this notification can not aggrress into the technical domain of cement production.

§§ When it comes to the question of preparing concrete, mortar and plaster, cement and aggregate are mixed together whereof the fly ash in cement is a product of blend but not a constituent of raw material.

While neither MOEF nor thermal plants guarantee the quality of fly ash, none of them should have the say to decide the minimum input of fly ash either in raw materials or in finished product. Prudence may prevail on the part of MOEF in allowing the market forces to decide their mix/blend ratios in accordance to the marketing logistics.

Fly ash allocation:



It was nice that the notification insisted for at least 20% dry ESP fly ash to be made available to brick industry on priority basis. The value addition for fly ash in cement industry is approx. Rs.600-1200 per ton (by replacing clinker) whereas in brick industry it is only Rs. 100-200 per ton, which is even eroded by transport costs. Hence brick industry can not absorb any cost to fly ash. Thus MOEF is reasonable in insisting for allocation of fly ash to brick industry without any charge and indirect costs.

The following scenario gives the potential for fly ash use in two salient segments:

Component	Market potential	Average fly ash input	Total fly ash requirement
Cement	200 mn. tons	30%	60 mn. tons
Bricks	200 bn. Bricks eq. to 600 mn. tons	30%	180 mn. tons

It is true that fly ash-use has become more popular in cement and concrete and hence allocation of 80% to this segment is more desirable. But as the demand picks up more and more in brick segment, the allocation should be 1:3 between cement and brick. In this context, the notification should be read as follows:

“At least 20% of dry ESP fly ash shall be made available free of charge to units manufacturing fly ash or clay-fly ash bricks, blocks and tiles on a priority basis over other users. If the demand from brick industries increases beyond 20% of fly ash output of corresponding thermal plant, the additional demand over and above 20% should also be met by providing fly ash free of charge on priority basis by the power stations. .”

Clause 3 (1) Permission to sell fly ash

When a waste (byproduct) becomes a product of demand the generator can always be given with the benefit of encashment. According to INSWAREB, a ‘waste product’ can be upheld as a ‘product of demand’ only when 100% of its generation is booked devoid of any incentive or promotional support.

The permission to sell fly ash would encourage the political touts to sneak in as middle men, who will corner the fly ash and sell to actual users at exorbitant prices without giving benefit to power plant or actual users. This is already happening at Tamilnadu and other places even now. Hence this sale has to be restricted only to direct users. In this context the clause may be amended as follows:



“(1) all coal or lignite based thermal power stations would be free to sell fly ash only to direct users, without the involvement of middlemen or any other third party, subject to the following conditions, namely:

(iii) Any thermal plant, found to encourage clandestine deals of selling fly ash to third parties, other than direct users, or to direct users through agents and middlemen, would be barred and (MOEF should mention the punitive action to be taken on such erring power plant).”

Clandestine diversion of 20% fly ash (allocated to Brick Industry) to Cement industry by thermal plant in the interest of earning more revenue:

As the notification permitted to sell unused portion of 20% fly ash (allocated to brick industry), there is a great danger for the brick industry whereby thermal plants would discourage brick industry and sell their fly ash to cement industry. A similar tussle happened at VTPS, APGENCO, forcing the brick industry to approach AP High Court (W.P. No.188/2007). The game plan of VTPS, APGENCO, should be analysed and commensurate averting clauses should be incorporated in the notification.

Targets on unutilized fly ash – Mockery of clauses:

While insisting for 100% utilisation of fly ash within 4 years of issuing the notification on one hand, certain directions of the draft may prove detrimental to the agenda on the other. It may be noted that, when fly ash was given free of cost, the consumption did not exceed 35% of generation over 10 years of contemplations. Now, in the context of permitting the sale of fly ash, which may trigger off horse trading in selling fly ash discouraging ultimately the use, how does the notification expect the power plants to reach the target of 100% use within four years? Any G.O that does not adopt practical path would perforce drive the public to aggress. This is what has been witnessed since 1999 with regard to directions on 100% fly ash use:

- none of the thermal plants have reached 100% use of fly ash;
- no clay brick kilns were banned within 100 km radius;
- many public sector undertakings and government construction agencies have comfortably used clay bricks despite availability of fly ash bricks and PPC;
- no dispute settlement committees worked seriously;
- hardly any state-level committees formed and, wherever formed, no seriousness was paid to the agenda of the notification seriously;

While permitting sale of fly ash, one plausible suggestion is that the thermal plants should be permitted to sell their fly ash only upon reaching 100% utilisation. What does it mean?



- ❑ In the anxiety of attaining the status of sale, thermal plants would adopt innovative marketing techniques to fulfill the target of 100% utilisation.
- ❑ Once a thermal plant attains 100% fly ash-use, then the fly ash is no more a waste product justifying the permission to sell.

The 1999 notification read with amendments in 2003, which has banned the production and use of clay brick in 100 km radius of thermal plants, failed right in Delhi, the seat of CPCB, because of impractical directions. An investigation for the failures is necessary; there upon corrective measures are required to plug the loopholes before carrying forward the same clauses in notification. We give some of the investigated points here under for the non-compliance of notification:

- ***Fly ash is not available as easy as clay.*** In result, production of fly ash bricks around Delhi is far lesser than the aggregate production of clay bricks in the same area.
- Thermal plants extended only lip sympathy to brick industry, disrespecting various directions of 1999-notification with regard to extending support to the proliferation of fly ash brick industry.
- Inadequate availability of fly ash bricks encouraged operations of clay brick kilns, aggrassing the notification.

Then how does the ban on clay bricks get invoked?

- The government should ensure availability of fly ash as easy as clay.
- Government should invoke all practical strategies in facilitating the proliferation of fly ash brick industry in letter and spirit, commensurate to clay brick demand.
- Thermal plants should set up 'fly ash depots' at urban centers in 200-300 km radius of their existence to make available fly ash to brick manufacturers without any hassles.

The day fly ash bricks are profusely available outwitting the supply and keeping its price edge over clay bricks, the ban gets invoked automatically out of consumers' volition.