

Expert Group Recommendations for Adapting HVFAC

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Expert Group Recommendations *for adapting HVFAC*

- CII-CANMET/CIDA project organized **HVFAC Conclave** in New Delhi on 19th October 2005 with the objective to identify and address the issues that cause hesitation and concern in the use of HVFAC.
- The issues were grouped in to three broad themes,
 - *fly ash management,*
 - *regulatory regime, and*
 - *construction aspects.*

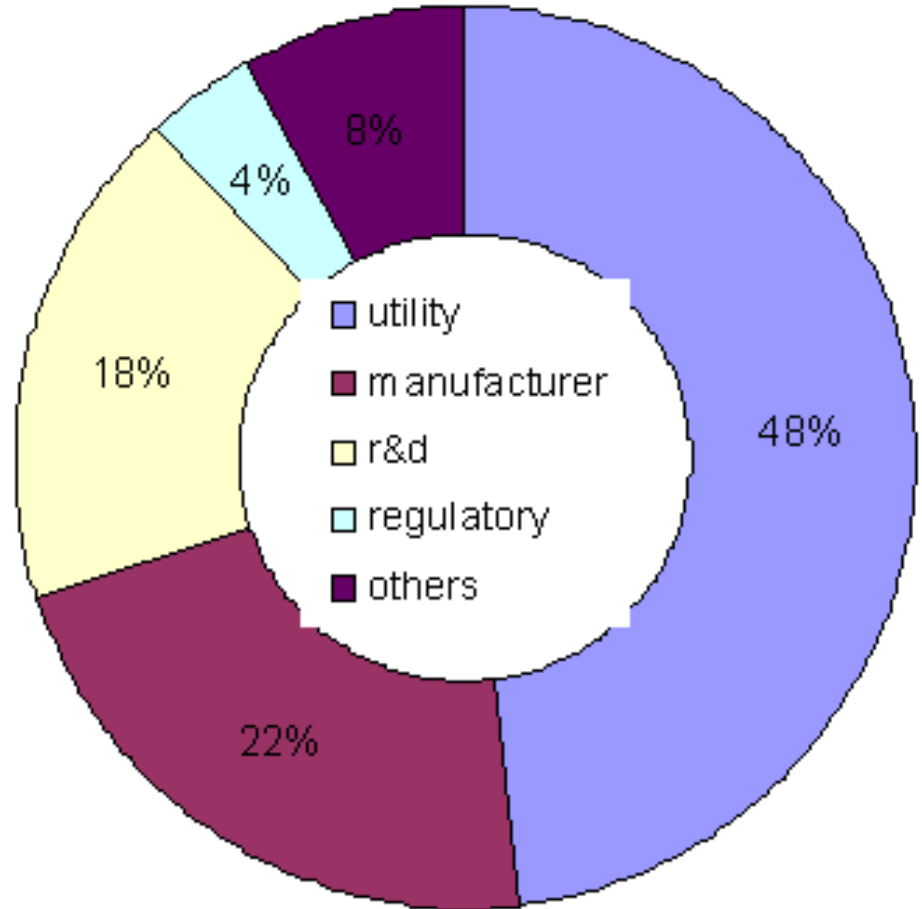
Expert Group Recommendations *for adapting HVFAC*

- A report containing discussion and recommendations of the conclave was prepared and finalised by a group of experts selected from the participants.
- This presentation provides salient points of recommendations made in the report.
- **Outline of the presentation:**
 - *participants,*
 - *issues discussed,*
 - *recommendations, and*
 - *tasks to perform.*

Participants

Total participants were 50

- **Utility:**
 - *Govt. / P.S.Us,*
 - *Private industries,*
 - *Power generation co(s).*
- **Manufacturers:**
 - *Cement,*
 - *Fly ash supplier.*
- **R & D organizations:**
 - *Academic institutions,*
 - *R &D labs,*
 - *Consultants.*
- **Regulatory authority**
- **Others:**
 - *CII + CANMET,*
 - *Journal,*
 - *Fly ash mission.*



Issues discussed

FLY ASH MANAGEMENT

- Availability of fly ash at different locations in India.
- Supply of fly ash of requisite quality.
- Consistency of fly ash.
- Processing of fly ash.
- Quality assurance system / material certification.

Issues discussed

REGULATORY REGIME

- BIS requirements of fly ash for PPC and batch-mix concrete,
- Certification test,
- Limitation on quantity of fly ash,
- Mix proportions,
- Specifications, and
- R & D activities.

Issues discussed

CONSTRUCTION ASPECTS

- Batching and mixing methods
- Curing
- Stripping of shuttering
- Use of PPC vs. fly ash as partial replacement of cement
- Special issues related to application in mass concreting, pavement, and residential and industrial structures.

Recommendations

(Objective is to maximize utilization of fly ash in Indian construction industries.)

1. Fly ash is a resource material, positive effects of using it in concrete are,
 - 1) *Concrete of enhanced quality*
 - *better rheology,*
 - *enhanced durability, and*
 - *higher strength,*
 - 2) *Preservation of resources (limestone, coal).*
 - 3) *Environment friendly utilization of FA and reduction of greenhouse gas emissions.*

Recommendations

2. Preparation of a national fly ash catalogue containing the following information from all Indian CF-TPPs,
 - 1) *Name, location and types of TPP.*
 - 2) *Type of coal (used.*
 - 3) *Collection system of fly ash*
 - 4) *Preliminary characteristics of the fly ash.*

Information available with ‘Fly Ash Mission’, NTPC, S.E.B’s and other agencies could be used in developing the catalogue.

Recommendations

3. There exist a tremendous commercial potential in supplying FA of requisite quality. Independent party may be engaged to collect & supply certified FA. The certification should contain,
- 1) *Fineness (in terms of retention on 45 micron sieve) and also loss on ignition (LOI) for all batch production of fly ash.*
 - 2) *All information on characteristics of FA (as per IS 3812) to be generated when operation procedure of the plant is modified, or source/characteristics of coal is changed.*

Recommendations

4. Fly ash should be incorporated in construction as follows:

1) *Through PPC in unorganized sector, where QA/QC as per relevant BIS codes cannot be implemented, or when hand mixing is adopted for concrete production. To encourage more use of fly ash in this sector, PPC with 35% fly ash content should be made available.*

2) *HVFAC in organized sector where QA/QC control as per relevant BIS codes can be implemented*

Recommendations

1. Requirements of fineness, lime reactivity and pozzolanic activity index are not necessary for fly ash to be inter-ground for PPC as long as
 - *the codal requirement of LOI is satisfied, and*
 - *pond ash is not used.*

Recommendations

6. Fly ash that are enabling to produce that conforms to IS3812: 2003 can be used directly, two options exist
- 1) *Collect FA from all fields of ESP, store in a common silo and supply this mixed FA.*
 - 2) *Store field-I FA in one silo and supply this to cement plants; collect and store FA from field-II onward and store in a separate silo for using in HVFAC (at batching plant).*

Fly ash, which does not conform to IS 3812: 2003 should be processed before use.

Recommendations

7. Recommendations on construction aspects:

- 1) Hand mixing shall not be used in production of HVFAC. Mixture with weigh batching that can produce homogenous mix of normal OPC based concrete, is suitable for the production of HVFAC.
- 2) Two stage curing; initial (dry) and wet curing is suitable for HVFAC.
 - ***Initial curing*** should be started immediately after placing of concrete by covering the exposed surface with an impervious sheet or by applying a curing compound.

Recommendations

- *Wet curing* for fly ash-based concrete should be started after final setting (with some margin) of concrete and shall be continued up to
 - § 10 days if fly ash content is up to 35%, and environment is humid.
 - § 14 days for dry environment, or when fly ash content is more than 35%.

Recommendations

- 3) Shuttering could be stripped as per IS 456 in construction using HVFAC.

Alternate appropriate arrangement for curing shall be made to cure the surface and continued up to stipulated period if the shutter provides the means to cure the surface.

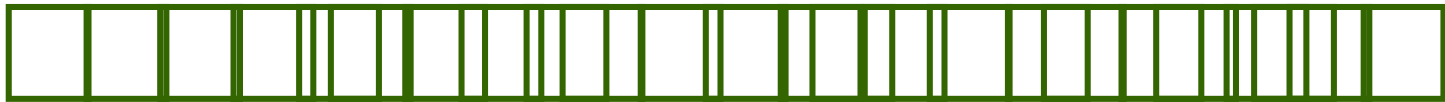
- 4) Specification of transportation and placement of HVFAC is similar to that of OPC with low w/b ratio; no special precaution is required.

Tasks to Perform

- 1) Preparation of a national fly ash catalogue.
- 2) Engagement with regulatory organizations like BIS, IRC for revision of relevant codes/standards/specifications in line with the discussion and recommendations made by the Conclave.
- 3) Preparation of guidelines on quality assurance and certification system for collection and supply of fly ash from power plants to the user.

Tasks to Perform

- 4) To facilitate development of entrepreneurship for supplying fly ash of requisite quality to the user,
- 5) Preparation of a hand book type of document for engineering fly ash – concrete mixes with specified requirements and containing certain useful tips for construction, and
- 6) To take up the matter of use of fly ash-based concrete, especially HVFAC, in construction with Government Departments/organizations, PSUs and private industries.



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