



Do you use cement for construction projects?

Would you like to improve this process in the following areas?

- **Meet environmental compliance regulations.** Comply with Executive Order 13101 requirements and EPA comprehensive procurement guidelines. Media area is solid waste.
- **Improve workers' safety and health.** No change to current operations
- **Increase productivity.** No change to current operations.
- **Save money.** Reduce concrete procurement and construction costs.



High Fly Ash Content Concrete Construction

Use of concrete mixtures containing high quantities of Class F coal fly ash can reduce cement consumption, reduce construction costs, enhance structural durability, and conform with EPA-directed affirmative procurement requirements. Fly ash is a waste material collected in the filtering systems that remove particles from the exhaust gases of coal-fired power plants. Replacement of up to 30% of portland cement used in concrete mixtures by fly ash can result in total concrete cost savings of up to 9%. Completed structures using this mixture will have enhanced long-term durability and extended life expectancy compared to structures built using current practices. Also, Federal procurement guidelines and directives require Department of Defense agencies to purchase recycled content products for EPA designated items, including construction materials such as cement and concrete containing recycled fly ash. **Recent construction projects containing high fly ash content concrete have been successfully completed at Naval Air Station Point Mugu, Marine Corps Air Station Miramar, and Naval Shipyard Puget Sound.**

How can you achieve these improvements?

Use concrete mixtures containing high quantities of coal fly ash.

How does this method work?

Class F fly ash can be used to replace up to 30% of the portland cement content in concrete mixtures. Using high amounts of fly ash in the mixture can improve the long-term ultimate strength of concrete.

How will this method save you money?

Reduce cement procurement and construction costs. Improved concrete quality will also result in improved durability that will reduce maintenance costs and increase concrete life.

How can this method eliminate or reduce pollution?

Using high fly ash content concrete reduces the disposal of recyclable materials. Implementation will result in the following pollution reductions:

- Reduce the quantity of fly ash material that would be sent to a landfill.
- Prevent the expense of disposal for waste fly ash that can be recycled into useful construction materials.
- Reduce the quantity of waste generated from the concrete manufacturing process.

Which applications can benefit most from this method?

Concrete mixtures containing high fly ash content can be used on many new and renovation construction projects. Typical applications include:

- Waterfront structures
- Pier repairs
- Airfield pavements
- Walls and girders

How can this method reduce regulatory compliance concerns?

Using high fly ash content concrete constitutes affirmative procurement of recovered materials as directed by EPA. Implementation will result in the following regulatory compliance benefits:

- Helps facilities comply with the waste reduction and affirmative procurement requirements of Executive Order 13101.
- Helps facilities comply with 40 CFR 247 and meet the EPA's recovered materials advisory notice.
- May help facilities meet pertinent solid waste reduction goals including the Department of Defense Measures of Merit goal to ensure the diversion rate for non-hazardous solid waste is greater than 40% by 2005.



Achieving Environmental Compliance Through Pollution Prevention

Every day the Navy faces the challenge of operating and maintaining the fleet while complying with environmental regulations. This burden can be reduced by using pollution prevention technologies and methods to reduce compliance requirements. This fact sheet is one in a series designed to encourage activities to use pollution prevention technologies and methods. The overall goal of this series is to promote sustained environmental compliance at the lowest life-cycle cost.

For additional information, contact:

Information on high fly ash content concrete products can be found on the US EPA Comprehensive Procurement Guidelines web site (**Web:** <http://www.epa.gov/epaoswer/non-hw/procure/cement.htm>). A table showing NAVFAC guide specifications for building design can be seen at <http://enviro.nfesc.navy.mil/esc426/Documents/CPGINNFGS.htm>.

Program POC:

(805) 982-5318, DSN 551-5318

E-mail: Fact.Sheet.ProgramPOC@nfesc.navy.mil

Technical POC:

(805) 982-1055, DSN 551-1055

