

High Volume Fly Ash for the 2 Folsom Project

High Volume Fly Ash (HVFA) concrete was successfully used as the cornerstone of this project's sustainability program. HVFA concrete was aggressively pursued because of its environmental benefits. When fly ash is used in place of cement, energy and landfill space is conserved and greenhouse gas emissions are reduced. During this HVFA project, roughly 2,800 tons of CO₂ emissions were eliminated and 2,500 tons of fly ash were diverted from landfills.

The Two Folsom Project served as a real world research and development laboratory for HVFA projects. Many trial batches with fly ash contents of up to 50% were tested for different strengths needed on various parts of the project. HVFA concrete, containing 30% to 50% Class F fly ash, was first used on the temporary working slab. It was placed in segments to experiment with the field application of different mix designs with various fly ash percentages. This data was then used to refine the final HVFA concrete mix designs. In the end, 12,000 cubic yards of HVFA concrete were used in the shear wall foundation, foundations, basement perimeter walls, columns, curbs and pads, and metal deck slabs. Fly ash content ranged from 20% to 50% in these applications (see table).



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The 2 Folsom Project in historic San Francisco Bay encompasses many green building practices and technologies. The 15-story, 540,000-square-foot building is the new headquarters for GAP, a company with a corporate commitment to the environment.
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HVFA concrete was used to enhance the integrity of the waterproofing systems in areas that required an impervious membrane. This included the slab on grade, foundation, pile caps and basement perimeter wall grade beams.

Delayed setting times and finishability were initial concerns, but with the addition of chemical admixtures there was little, if any, delayed set with the concrete, and the finishing process was completed as expected, comparative to that of conventional concrete without any additional costs. No special curing was needed on the concrete containing 15% to 33% fly ash. A 7-day wet cure was used on concrete containing more than 33% fly ash such as the slab on grade, which was still crack-free after more than two years of service.

The contractor, Swinerton Builders, achieved a better in place concrete product by using HVFA mixes, and they were able to stay on schedule. They determined that properly proportioned HVFA concrete is adaptable to current building practices and are confident they will use HVFA in future projects.

Application/Area	Fly Ash Content*	In Place Yardage	Design Strength
Temporary Working Slab	33%	1,250	3,000 psi
Shear Wall Foundation	33%	2,325	5,000 psi
Foundations	50%	1,950	5,000 psi
Basement Perimeter Walls**	20%	2,000	4,000 psi
Slab on Grade	50%	3,400	4,000 psi
Columns	33%	75	5,000 psi
Miscellaneous Curbs/Pads	33%	675	3,000 psi
Metal Deck Slabs	33%	325	4,000 psi

* Concrete mixes with 15% fly ash content not included.

** Shotcrete application.

HVFA concrete was the main sustainable feature of the 2 Folsom Project.

For more information or answers to questions about the use of fly ash in specific applications, contact your nearest Headwaters Resources Technical Sales Representative or call 1-888-236-6236.

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