The P2R2 Section’s mission is to minimize the amount of liquid, solid and gaseous pollution as well as energy & water consumption within Pinellas County.

If you are interested in the economic and environmental benefits of reducing wastes in your business, please contact the P2R2 Section at (727) 464-4761.

Pinellas County Department of Environmental Management
512 S. Ft. Harrison Avenue
Clearwater, FL 33756

Printed on Recycled Paper

Pinellas County complies with the Americans with Disabilities Act. To obtain accessible formats of the document, please contact the Department of Environmental Management at: (727) 464-4761/TDD (727) 464-4106
Pinellas County Department of Environmental Management’s

VISION

The Department of Environmental Management is dedicated to providing responsible leadership necessary to manage our natural and urban environment to meet the needs of our present and future Pinellas County citizens.
About This Manual

This manual is a guide for concrete batch plant owners and operators to assist in establishing waste reduction opportunities. Concrete batch plants, as defined for this manual, include plants that store, measure and transfer concrete constituents into trucks for transport to a job site, plants that use a central mix drum to manufacture concrete on-site for transfer to transport trucks, and plants that pre-cast products on-site such as concrete bricks.

Pollution prevention opportunities presented in this manual may not be practical for all concrete batch plants. Plant owners and operators are encouraged to evaluate waste reduction opportunities based upon their facility’s individual operations. Additional opportunities may exist beyond those identified in this manual. As owners and operators, you have the expertise to identify those opportunities applicable to your operations.

Manuals are developed by the Pollution Prevention and Resource Recovery Section of the Pinellas County Department of Environmental Management, a non-regulatory program that provides waste reduction technical assistance. Program staff provide information on new technologies, process modifications, substitute products, and current industry-specific Best Management Practices (BMPs). Staff can assist businesses in their efforts to become more efficient,
profitable, and competitive, while complying with regulatory requirements. As a Pinellas County business, no fees are charged for using the Pollution Prevention Program’s services. On-site waste reduction assistance is available by contacting program staff at (727) 464-4761.

**ACKNOWLEDGEMENT**

Information support for this document provided by the Florida Department of Environmental Protection’s Pollution Prevention Program and the National Ready Mix Concrete Association (NRMCA) publication, *Environmental Management Practices* (Pub # 191).

The printing and distribution of this document was funded with Air Pollution Recovery Funds.

**Introduction**

Stationary and relocatable concrete batching plants are subject to 62-210.300 of the Florida Administrative Code (F.A.C.). Rule 62-296.320(4)(c), F.A.C., requires owners and operators to use reasonable precautions to control unconfined emissions related to batch plant operations. Operations include hoppers, storage and conveying equipment, conveyor drop points, truck loading and unloading, roads, parking areas, stockpiles, and yards. Regulatory requirements can increase operating costs while decreasing a business’ ability to compete. In fact, increased competition demands reducing costs. However, Best Management Practices (BMPs) and new technologies are available that offer facilities an opportunity to comply with the regulations and reduce emissions while saving money and improving efficiency.

**What is pollution prevention?**

It is the reduction or elimination of pollutants or wastes at the source. The idea behind pollution prevention is to avoid producing the waste in the first place. If the waste is not produced, then you don't have to worry about storage or disposal problems. Having less waste means a better environment for all of us.
**Preventing pollution has its benefits!**
- Reduce facility-wide wastes!
- Save money!
- Protect workers, the public, and the environment!
- Improve your company image!
- Reduce the risk of liability!

**Many pollution prevention practices are low-cost and low-risk alternatives to help minimize waste and associated disposal costs.**

**How do I use this manual?**
- Read the information manual and make a commitment to pollution prevention. This commitment should start with the owner and facility operator. Pollution prevention (P2) should be part of your company’s policy.
- Involve all employees. Every employee must be aware of the importance of waste reduction through pollution prevention practices. Their participation and suggestions in your waste reduction program will help to make it a success.
- Evaluate your facility’s wastes to see how much and what kind of waste is being produced. This will make it easier for you to spot areas where pollution prevention tips can be applied.
- Identify potential pollution prevention measures provided in this manual that may help your business.
- Identify new ideas. Trade journals, magazines, employees, vendors, your business trade associations or even inspectors are valuable resources to generate new waste reduction ideas. A “business-as-usual” approach hinders your waste reduction efforts and may not maintain your competitive edge!
- Implement new practices! Evaluate any P2 measures before you put them in place. Consider economic feasibility, productivity effects, and long-term usefulness.
- Re-evaluate your waste reduction opportunities often. New opportunities to reduce wastes arise every day!
- Contact the Pollution Prevention and Resource Recovery Program at (727) 464-4761 for assistance.

**Publications/Articles**
*Environmentally Friendly Solutions For The Disposal Of Concrete Wash Water From Ready Mixed Concrete Operations*, October 1996; The University of Florida, Gainesville, Florida, U.S.A.
[http://www.p2pays.org/ref/06/05817.pdf](http://www.p2pays.org/ref/06/05817.pdf)
Wastes Associated With Concrete Batch Plant Operations

The first step toward waste minimization is to identify your waste sources. Sand, aggregate, cement and water are typical raw materials used in concrete batching operations.

During your waste assessment, ask yourself the following:

- What are the wastes created by the materials I use?
- Is there a safer material that will do the same job and reduce wastes?

Air Emissions

As a concrete batch plant operator, you are responsible for controlling unconfined emissions related to batch plant operations. Point source emissions are a result of the transfer of material to silos. Fugitive source emissions include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Particulate matter is a primary pollutant of concern.

Wastewater and Stormwater

Stormwater runoff is another primary pollutant of concern resulting from concrete batch plant operations. Potential wastewater and stormwater pollutants include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

Hazardous Wastes

A waste is considered a hazardous waste if:

1) It has any one or more of the following characteristics:

Ignitable (D001)

Ignitable wastes are easily combustible or flammable. They have a flashpoint of less than 140°F or an alcohol content of 24% or more. (The flashpoint is the lowest temperature at which the vapor of a combustible liquid can be made to ignite in air.)
Regularly inspect and provide maintenance of the sediment traps to avoid discharges of contaminated water from the site

- Seal aboveground fuel and chemical additive storage areas with an impervious material and berm to contain spills and leaks
- Test underground storage tanks annually for leaks or necessary repairs

**A Final Consideration...**

One of the easiest and least expensive ways to reduce your wastes is keeping your facility clean. Poor housekeeping results in spills and overflows. This may double your expense by making you pay to replace lost material and also for its treatment and disposal. It can also lead to accidents and worker injury. Here are some tips:

- Sweep site regularly to remove dust buildup
- Clean up all spillages or deposits of materials on ground immediately
- Use dry clean-up methods whenever practical (sweeping, dust collection vacuum, wiping, etc.)
- Instruct staff and drivers to never dump any materials in open areas

The following Resources Section provides additional assistance on waste reduction in your concrete batch plant operations.

**RESOURCES**

**Assistance Centers and Information Sources**

**Pinellas County**

Department of Environmental Management,
Pollution Prevention Resource Recovery (P2R2) Program ......(727) 464-4761
Air Quality Division...............................................................(727) 464-4422
Utilities/Solid Waste ............................................................(727) 464-7500

---

**Corrosive (D002)**

Corrosive wastes are liquids that dissolve metals and other materials, or burn the skin. They have a pH of 2 or lower, or 12.5 or higher.

**Reactive (D003)**

Reactive wastes are unstable and react rapidly or violently to shock, heat, or pressure, or when mixed with water or other materials.

**Toxic (D004)**

Toxic wastes generally have adverse health effects. They need only contain a small amount of a certain material such as heavy metals or toxic organics.

---

**OR**

2) It is listed as a hazardous waste in the Code of Federal Regulations, 40 CFR Part 261. This list is very long and may include chemicals that you use daily. If you are unsure, it is suggested that you refer to the list cited and have your waste tested by an approved laboratory.

**Handling and Disposal of Hazardous Wastes**

The proper handling of hazardous wastes is critical in assuring the health and safety of the public and protection of the environment. Some important things to remember are:

- Never pour waste fluids on open ground, in storm drains, or down shop drains.
- Never mix hazardous and non-hazardous wastes. Even a little hazardous waste can make the entire mixture hazardous and more expensive to dispose of properly.
- Re-use either weak wastewater/stormwater for rinsing truck exteriors, or fresh water that is collected separately from other process waters
- Re-use water for drum and chute washing, and for slumping
- Re-use water for plant and grounds wash-down and dust suppression
- Wherever feasible, divert clean stormwater (e.g. roof run-off) away from contaminated areas and into an approved stormwater discharge system
- Use berms or curbs around truck loading areas, aggregate piles, truck washing stations, drum and chute wash-out areas, and chemical staging areas to capture contaminated stormwater and process wastewater
- Use site grading and porous paving to improve stormwater handling from the general plant site
- Design a wastewater collection and recycling system to collect contaminated water from:
  - agitator washout
  - truck washing
  - yard washdown
  - contaminated stormwater
  - concrete batching area
  - slump stand
  - any other wastewater from the batching plant operation
- Direct process wastewater and contaminated stormwater from the entire site to an on-site settling pond, or series of ponds. This water can be reused in the concrete batching process.
- Protect stormdrain inlets from waste concrete/dust runoff
- Develop a routine yard and equipment maintenance program to considerably reduce the potential for discharge of sediment to your wastewater collection and recycling system
- Install sediment traps within the boundaries of the site

**Containers**
- Maintain containers in good condition. Prevent leaks, ruptures and the accumulation of rainwater on the top of drums.
- If a container leaks, transfer all of the waste to a new container.
- Keep lids on, and containers closed, when not in use.
- Use funnels when pouring liquids.
- Use containers that are compatible with the waste being stored.
- Do not mix different or incompatible wastes in the same container.

**Labels**
Proper labeling can reduce accidents and ensure proper disposal. The example of a label below shows some of the information that should be included.

**Waste Storage Areas**
- Try to store all hazardous wastes in a single area, however do not store incompatible materials beside each other. Satellite collection points are allowed for work-in-progress, but should be moved to the main storage area once the container is filled or not in use.
- Wastes should be stored in a covered area to prevent stormwater runoff and protect the containers from weather exposure.
- Secondary containment should be provided that is able to contain at least 110% of the largest container’s capacity in case of leaks, spills, or punctures. It should have an impermeable (sealed) surface and should be under cover, preferably indoors.
• Ensure that there is sufficient aisle space between drums to allow complete inspection for leaks or damage.
• Check with the local Fire Department for their requirements.

**Transportation and Disposal**
• Hazardous waste must be shipped out by a properly permitted hauler to an EPA-approved treatment, storage, and disposal facility. Check for all the proper local, state, and federal licenses.
• Use reputable permitted companies for transport and disposal. You are forever liable for any hazardous waste that you generate; a “cradle-to-grave” liability. Even if you have proper documentation, you may still be a potentially responsible party to a clean-up if your waste contributes to the contamination of the environment.

**Inspections and Record Keeping**
• Keep all records of hazardous waste handled for at least three (3) years on-site. This includes amounts purchased, stored, reused, and hauled away.
• Keep records of lab tests for at least three (3) years.
• Keep land disposal restriction forms for at least five (5) years.
• Inspect storage containers and areas for leaks or damage at least once per week and maintain a written inspection log on-site for at least three (3) years.
• Keep any training records for at least three (3) years.
• An EPA identification number should be obtained by any facility generating a hazardous waste, unless officially classified as a “Conditionally Exempt Small Quantity Generator.” Contact the address below:

  **Florida Department of Environmental Protection**  
  **Southwest District**  
  **Hazardous Waste Management**  
  3804 Coconut Palm Dr.  
  Tampa, FL 33619-8318  
  (813) 744-6100

**Mixer Rinse Operations**
- Install shutoff valves to eliminate overfilling truck water tanks
- Install flow control nozzles and smaller diameter hoses on rinse stations
- Limit drivers to 150 gallons or less of rinse water
- Consider metering or using a timer to dispense water for mixer flushing
- Instead of washing out the mixer, use recycling admixtures to stabilize the concrete residues in the drum. Using a maximum of 40-50 gallons of fresh water and the suggested dosage of recycling admixtures will rinse mixer drums. The slurry can be used in the next batch, or the first batch the following day. Studies have shown that these slurries were successfully used in batching operations eight hours, or longer, after adding the recycling admixture.

**Wheel Washes**
- Design wheel washes to account for the maximum extended tire length expected
- Locate wheel washes in an area that provides a sufficient track-out distance before exit from the property
- Minimize off-property track-out by providing a large aggregate or paved roadway immediately after the wheel wash within property boundaries
- Install motion sensors on wheel wash units to provide water only on-demand

**Wastewater**
- Re-use wastewater, wash water and stormwater for concrete batching. Process water in the range of pH 6-9, and 50-200 parts-per-million total suspended solids (TSS) is ideal for re-use in batching, washing and rinsing. Monitor process water pH and TSS to ensure these ranges are met for rinsewater to be re-used for batching. ASTM Specification C-94 permits the use of wash water from mixer washout operations for mixing fresh concrete, as does Portland Cement Association (PCA) (10) standards. Literature indicates that concrete batched from process water strength-tests equal to, or greater than, concrete made using fresh water.
Clean up any raw material spills by dry sweeping. Water should not be used in the process of cleaning up spills except where the area drains to an effective wastewater collection point.

**Waste Concrete**

- Consider installing a recycling system to reclaim residual concrete aggregate for reuse in batching operations. Systems are available that use carbon dioxide or acid (carbon dioxide is the safer alternative) to lower pH and filtration to remove solids. Resulting filter cakes may be substituted for limestone in road base, parking lots, or other applications.
- Consider collecting waste concrete in a suitable washout pit where it becomes gravel, sand and sludge, which can subsequently be collected and reused.
- Consider reuse opportunities for non-hazardous waste sediment, sludges and fines as fill material, gravel road stabilizer, or landfill cover.
- Use waste concrete on-site for construction purposes (e.g. bunker blocks, paving unsealed areas, fill around buildings, parking lot and driveway aggregate). Check with your local permitting agency for roadway requirements.
- Use commercially available delayed set admixtures designed to keep leftover concrete in mix trucks in liquid form to be added to the next batch of mix.
- Consider using safer, less toxic admixtures than chemical additives. Sugar and wood-based admixtures are available.
- Crush waste blocks and bricks to use for groundcover, walkways, tracks, landfill cover, and the remanufacture of other types of block walls, dividers, or curbs.
- Recycle dust into future concrete batches.

**Regulated Non-Hazardous Wastes**

Although not classified federally as a hazardous waste, there are many materials that are stringently regulated in Pinellas County. When in doubt, treat a material as a hazardous waste until you are able to verify that it is not, and then determine what are the correct handling and disposal measures. A common example of this type of non-hazardous waste is used motor oil.

**Hazardous Materials**

Although less stringently regulated than hazardous wastes, the proper storage and handling of hazardous materials is equally important. Many of the storage and handling practices described above for hazardous wastes should, and in some cases must, be applied to hazardous materials as well. This includes certain labeling and spill prevention measures.

- Store on an impermeable (sealed) surface, i.e. resists infiltration or corrosion by the stored materials.
- Store under cover, to protect containers from the elements. Be sure containers are properly sealed.
- Provide secondary containment that will hold up to 110% of the largest container stored in the area. This area should be able to contain any leaks or spills.
- Label containers properly, including contents and date of generation for any hazardous wastes.
- Make sure drums are easily accessible but not stored in high traffic areas where they can be easily knocked over. Regularly check for any signs of leakage, rust, etc.

**P2 Opportunities in Concrete Batch Plant Operations**

There are many opportunities to reduce wastes generated by concrete batch operations. Your facility may already practice pollution prevention without realizing it!
Employee Education

Your pollution prevention efforts can only be successful if all employees are committed to minimizing operational wastes.

1) Are employees trained to:
   a) recognize and minimize environmental hazards? yes __ no __
   b) handle/transfer raw materials (sand, aggregate, cement, water) in a manner to reduce particulate emissions and wastewater runoff? yes __ no __
   c) clean equipment/vehicle in a manner to reduce airborne particles/wastewater runoff? yes __ no __
   d) clean vehicles before transporting materials off-site? yes __ no __
   e) use dry clean-up whenever possible? yes __ no __
   f) dispose of/recycle leftover cement properly? yes __ no __

2) Have you clearly outlined and explained to your staff and employees what pollution prevention and waste minimization are and encouraged their input in identifying site pollution prevention activities? yes __ no __

3) Do you provide incentives or awards for those who practice proper or new pollution prevention techniques? yes __ no __

4) Do you hold regular employee meetings to discuss changes or on-going equipment practices and procedures? yes __ no __

General Site Operations/Maintenance

- Locate/operate stationary CBP equipment, stockpiles and plant vehicles at least 25 feet from any property line
- Maintain all equipment, including dust/particulate collection equipment, according to manufacturer’s recommendations to prevent leaks
- Identify a buffer zone surrounding your operations in which you plan to contain primary dust generating activities
- Maintain stockpiles inside this buffer zone within three-walled bunkers which extend at least two feet above the top of the unload line
- Use a totally enclosed system for the loading, unloading, handling, transfer or storage of cement, pulverized fuel ash and/or other dusty raw materials
- Use dust-preventative barriers or vegetative buffers at least 12 feet high along roads and other traffic/work areas within your specified buffer zone

Fugitive Dust

Dust prevention equipment may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, fabric filters, etc.

- Consider prevailing wind directions in the design and set up of bunkers and conveyors. Bunkers and conveyors should be set up so as to minimize wind effects.
- If water sprays or dust suppression agents must be used to reduce dust, use application equipment and techniques that minimize water and material usage
- Receive aggregate material in a damp condition
- Provide conveyor barriers on at least one side
- Equip conveyors with a roof and spill trays to direct material to a collection point and a barrier on at least one side
- Use belt cleaning devices at the conveyor head to reduce spillage
- Conduct all material mixing operations within an effective enclosure (walls, screens, dust guards, tarps)
- Roof and enclose mixer loading areas on two or three sides
- Install an effective air extraction and filtration system to collect dust generated during mixer truck loading
- Enclose weigh bins and hoppers on three sides and roof where a front-end loader is used
- Extend roof at least six feet beyond load areas
- A water spray system for dust prevention should only be used as a final measure if you are unable to effectively prevent dust during operations using the opportunities identified in this checklist. Water sprays create a stormwater issue for your plant. Dry method cleanup and wind barrier equipment should be your first choice.
Fabric Filters

- Submit an Operation and Maintenance (O&M) Plan to Pinellas County’s Air Quality Division for approval
- Service and maintain fabric filters according to manufacturer’s recommendations
- Provide adequate access to the filters to allow for regular inspection and maintenance
- Keep a maintenance logbook to document compliance with manufacturer’s recommended maintenance

Road and Yard Dust

- Minimize dust emissions due to vehicle travel by:
  - site layout and design
  - vehicle wheel cleaning before leaving the site (dry cleaning method or the wheel and truck wash facilities at site exits)
  - posted vehicle speed limits
- Avoid using plant operational vehicles within 25 feet of any property line, except for entry and exit to the site
- If roadways are not paved, consider paving all regular paths of vehicle traffic (entry, exit, main traffic areas of plant operations, batch and material truck delivery roads) with a hard surface that can be cleaned by dry methods to minimize dust and run-off to nearby properties and stormwater systems
- Where it is not practical to pave a site (e.g. at a short-term location), a number of alternatives exist to reduce dust emissions from yards and roadways:
  - application of a thin layer of high quality pavement over road surface
  - chemical suppressant products (several options available)
  - vegetative barriers
  - mulch

Road and Yard Dust

- Minimize dust emissions due to vehicle travel by:
  - site layout and design
  - vehicle wheel cleaning before leaving the site (dry cleaning method or the wheel and truck wash facilities at site exits)
  - posted vehicle speed limits
- Avoid using plant operational vehicles within 25 feet of any property line, except for entry and exit to the site
- If roadways are not paved, consider paving all regular paths of vehicle traffic (entry, exit, main traffic areas of plant operations, batch and material truck delivery roads) with a hard surface that can be cleaned by dry methods to minimize dust and run-off to nearby properties and stormwater systems
- Where it is not practical to pave a site (e.g. at a short-term location), a number of alternatives exist to reduce dust emissions from yards and roadways:
  - application of a thin layer of high quality pavement over road surface
  - chemical suppressant products (several options available)
  - vegetative barriers
  - mulch

Storage Silos

- Vent all cement/fly ash storage silos and weigh hoppers to a fabric, baghouse or cartridge filter system
- Identify the cause of all visible emissions and take corrective action immediately
- Monitor filter systems to identify when cleaning/replacement is necessary
- Regularly check for tears or leaks in fabric/cartridge filter systems and suction shroud
- Choose filter systems designed to meet at least 0.01gr/dscf outlet
- Check all filter systems and mixer/truck loading control devices for visible emissions daily during plant operations
- Provide sufficient lighting near cement and/or fly ash silo filter exhausts to observe visible emissions performance during fills that occur during non-daylight hours
- Totally enclose all silo conveying systems to minimize fugitive emissions
- Monitor storage silo conveying systems for visible emissions and correct the cause of visible emissions immediately
- Install audible and visual high-level alarms on all storage silos to avoid overfilling and possible filter damage
- Use silos to store all materials capable of generating dust (cement, pulverized fuel ash, etc.)
- Connect the “high-level” alarm indicator to an automatic delivery shut-down to prevent overfilling
- Install test circuits on all alarms to test prior to each silo fill
- Maintain alarms in “working order” at all times
- Fit all silo and weighing scale vents with fabric filtering systems to collect dust
Check the seating of all silos’ pressure relief valves and reseat if necessary, before each delivery.
Enclose all receiving hopper areas on three sides up to 9 feet above the unloading point.
Avoid using receiving hoppers as material storage devices.

**Raw Materials**
- Substitute at least 15% to 35% fly ash for cement in concrete mixes. Some applications will accommodate up to 70%.
- Substitute coal-fired boiler, cinder and bottom ash, for aggregate in concrete building block manufacturing.
- Use sugar or wood-based admixtures that are safer and less toxic than other chemical concrete additives.

**Mixer Feed Operations**
- Vent the cement/fly ash weigh hopper inside the batch mixes.
- Use a water spray device to prevent dust/visible emissions at the mixer feed.
- Use a pickup device that delivers air to a filter to prevent dust emissions at the mixer feed.
- Use an enclosed batch mixer feed to prevent dust and visible emissions at the mixer feed.
- Conduct the entire mixing operation inside an enclosed process building to prevent dust and visible emissions.

**Material Handling/Storage**
- Store aggregates 5 millimeters or less in size in totally enclosed structures (e.g. storage bins).
- Do not handle aggregates 5 millimeters or less in open areas.
- Use ground stockpiling only if there is sufficient buffer area surrounding the plant.
- Enclose stockpiles on at least the top and 3 sides.
- Install a flexible curtain to cover stockpile entrance sides.
- Totally enclose the opening between the storage bin and material weighing scale.

**Conveyors**
- Enclose belt conveyors used for handling materials on top and 2 sides with a metal board at the bottom to eliminate any dust emissions due to wind effects.
- Enclose all conveyor transfer points. Fit conveyor passage openings with flexible seals to prevent dust generation.
- Provide scrapers at the turning points of all conveyors to prevent dust collection on the belt surface.
- Arrange conveyors delivering to material stockpiles in a way to minimize free fall.
- Enclose all free falling transfer points from conveyors to stockpiles with chute(s) and apply dust suppression materials at these points (suppression agents, water spray).

**Loading/Mixing Operations**
- Minimize airborne dust emissions during concrete truck loading operations.
- Pre-mix materials in a totally enclosed concrete mixer before loading the materials into the concrete truck.
- Vent all airborne dust emissions generated by material loading/mixing operations to fabric filtering systems.
- Totally enclose the loading bay during the loading process. Dust tarps and other dust prevention materials are available for pre-existing equipment. Check with your suppliers for currently available dust prevention supplies.
- Provide equipment necessary to clean all concrete trucks and other vehicles after loading (preferably dry method cleaning) and before exit from the property to wash off any dust and/or mud deposited on the wheels and/or vehicle body.
- Plan with the concrete truck driver exactly where rinsing can be done. Avoid locations where run-off will get into topsoil or flow into surface water.
Check the seating of all silos’ pressure relief valves and reseat if necessary, before each delivery
Enclose all receiving hopper areas on three sides up to 9 feet above the unloading point
Avoid using receiving hoppers as material storage devices

**Raw Materials**
- Substitute at least 15% to 35% fly ash for cement in concrete mixes. Some applications will accommodate up to 70%.
- Substitute coal-fired boiler, cinder and bottom ash, for aggregate in concrete building block manufacturing
- Use sugar or wood-based admixtures that are safer and less toxic than other chemical concrete additives

**Mixer Feed Operations**
- Vent the cement/fly ash weigh hopper inside the batch mixes
- Use a water spray device to prevent dust/visible emissions at the mixer feed
- Use a pickup device that delivers air to a filter to prevent dust emissions at the mixer feed
- Use an enclosed batch mixer feed to prevent dust and visible emissions at the mixer feed
- Conduct the entire mixing operation inside an enclosed process building to prevent dust and visible emissions

**Material Handling/Storage**
- Store aggregates 5 millimeters or less in size in totally enclosed structures (e.g. storage bins)
- Do not handle aggregates 5 millimeters or less in open areas
- Use ground stockpiling only if there is sufficient buffer area surrounding the plant
- Enclose stockpiles on at least the top and 3 sides
- Install a flexible curtain to cover stockpile entrance sides
- Totally enclose the opening between the storage bin and material weighing scale

**Conveyors**
- Enclose belt conveyors used for handling materials on top and 2 sides with a metal board at the bottom to eliminate any dust emissions due to wind effects
- Enclose all conveyor transfer points. Fit conveyor passage openings with flexible seals to prevent dust generation.
- Provide scrapers at the turning points of all conveyors to prevent dust collection on the belt surface
- Arrange conveyors delivering to material stockpiles in a way to minimize free fall
- Enclose all free falling transfer points from conveyors to stockpiles with chute(s) and apply dust suppression materials at these points (suppression agents, water spray)

**Loading/Mixing Operations**
- Minimize airborne dust emissions during concrete truck loading operations
- Pre-mix materials in a totally enclosed concrete mixer before loading the materials into the concrete truck
- Vent all airborne dust emissions generated by material loading/mixing operations to fabric filtering systems
- Totally enclose the loading bay during the loading process. Dust tarps and other dust prevention materials are available for pre-existing equipment. Check with your suppliers for currently available dust prevention supplies.
- Provide equipment necessary to clean all concrete trucks and other vehicles after loading (preferably dry method cleaning) and before exit from the property to wash off any dust and/or mud deposited on the wheels and/or vehicle body
- Plan with the concrete truck driver exactly where rinsing can be done. Avoid locations where run-off will get into topsoil or flow into surface water.
**Fabric Filters**
- Submit an Operation and Maintenance (O&M) Plan to Pinellas County’s Air Quality Division for approval
- Service and maintain fabric filters according to manufacturer’s recommendations
- Provide adequate access to the filters to allow for regular inspection and maintenance
- Keep a maintenance logbook to document compliance with manufacturer’s recommended maintenance

**Road and Yard Dust**
- Minimize dust emissions due to vehicle travel by:
  - site layout and design
  - vehicle wheel cleaning before leaving the site (dry cleaning method or the wheel and truck wash facilities at site exits)
  - posted vehicle speed limits
- Avoid using plant operational vehicles within 25 feet of any property line, except for entry and exit to the site
- If roadways are not paved, consider paving all regular paths of vehicle traffic (entry, exit, main traffic areas of plant operations, batch and material truck delivery roads) with a hard surface that can be cleaned by dry methods to minimize dust and run-off to nearby properties and stormwater systems
- Where it is not practical to pave a site (e.g. at a short-term location), a number of alternatives exist to reduce dust emissions from yards and roadways:
  - application of a thin layer of high quality pavement over road surface
  - chemical suppressant products (several options available)
  - vegetative barriers
  - mulch

**Storage Silos**
- Keep a routine maintenance log on-site of all equipment/filter systems, recording date and time of all corrective actions
- Provide integrated quality, safety and environmental management systems for the site, operation of the plant and delivery process
- Vent all cement/fly ash storage silos and weigh hoppers to a fabric, baghouse or cartridge filter system
- Identify the cause of all visible emissions and take corrective action immediately
- Monitor filter systems to identify when cleaning/replacement is necessary
- Regularly check for tears or leaks in fabric/cartridge filter systems and suction shroud
- Choose filter systems designed to meet at least 0.01gr/dscf outlet
- Check all filter systems and mixer/truck loading control devices for visible emissions daily during plant operations
- Provide sufficient lighting near cement and/or fly ash silo filter exhausts to observe visible emissions performance during fills that occur during non-daylight hours
- Totally enclose all silo conveying systems to minimize fugitive emissions
- Monitor storage silo conveying systems for visible emissions and correct the cause of visible emissions immediately
- Install audible and visual high-level alarms on all storage silos to avoid overfilling and possible filter damage
- Use silos to store all materials capable of generating dust (cement, pulverized fuel ash, etc.)
- Connect the “high-level” alarm indicator to an automatic delivery shutdown to prevent overfilling
- Install test circuits on all alarms to test prior to each silo fill
- Maintain alarms in “working order” at all times
- Fit all silo and weighing scale vents with fabric filtering systems to collect dust
**Employee Education**

Your pollution prevention efforts can only be successful if all employees are committed to minimizing operational wastes.

1) Are employees trained to:
   a) recognize and minimize environmental hazards? yes __ no __
   b) handle/transfer raw materials (sand, aggregate, cement, water) in a manner to reduce particulate emissions and wastewater runoff? yes __ no __
   c) clean equipment/vehicle in a manner to reduce airborne particles/wastewater runoff? yes __ no __
   d) clean vehicles before transporting materials off-site? yes __ no __
   e) use dry clean-up whenever possible? yes __ no __
   f) dispose of/recycle leftover cement properly? yes __ no __

2) Have you clearly outlined and explained to your staff and employees what pollution prevention and waste minimization are and encouraged their input in identifying site pollution prevention activities? yes __ no __

3) Do you provide incentives or awards for those who practice proper or new pollution prevention techniques? yes __ no __

4) Do you hold regular employee meetings to discuss changes or on-going equipment practices and procedures? yes __ no __

**General Site Operations/Maintenance**

- Locate/operate stationary CBP equipment, stockpiles and plant vehicles at least 25 feet from any property line
- Maintain all equipment, including dust/particulate collection equipment, according to manufacturer’s recommendations to prevent leaks
- Identify a buffer zone surrounding your operations in which you plan to contain primary dust generating activities
- Maintain stockpiles inside this buffer zone within three-walled bunkers which extend at least two feet above the top of the unload line
- Use a totally enclosed system for the loading, unloading, handling, transfer or storage of cement, pulverized fuel ash and/or other dusty raw materials
- Use dust-preventative barriers or vegetative buffers at least 12 feet high along roads and other traffic/work areas within your specified buffer zone

**Fugitive Dust**

Dust prevention equipment may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, fabric filters, etc.

- Consider prevailing wind directions in the design and set up of bunkers and conveyors. Bunkers and conveyors should be set up so as to minimize wind effects.
- If water sprays or dust suppression agents must be used to reduce dust, use application equipment and techniques that minimize water and material usage
- Receive aggregate material in a damp condition
- Provide conveyor barriers on at least one side
- Equip conveyors with a roof and spill trays to direct material to a collection point and a barrier on at least one side
- Use belt cleaning devices at the conveyor head to reduce spillage
- Conduct all material mixing operations within an effective enclosure (walls, screens, dust guards, tarps)
- Roof and enclose mixer loading areas on two or three sides
- Install an effective air extraction and filtration system to collect dust generated during mixer truck loading
- Enclose weigh bins and hoppers on three sides and roof where a front-end loader is used
- Extend roof at least six feet beyond load areas
- A water spray system for dust prevention should only be used as a final measure if you are unable to effectively prevent dust during operations using the opportunities identified in this checklist. Water sprays create a stormwater issue for your plant. Dry method cleanup and wind barrier equipment should be your first choice.
Clean up any raw material spills by dry sweeping. Water should not be used in the process of cleaning up spills except where the area drains to an effective wastewater collection point.

**Waste Concrete**

- Consider installing a recycling system to reclaim residual concrete aggregate for reuse in batching operations. Systems are available that use carbon dioxide or acid (carbon dioxide is the safer alternative) to lower pH and filtration to remove solids. Resulting filter cakes may be substituted for limestone in road base, parking lots, or other applications.
- Consider collecting waste concrete in a suitable washout pit where it becomes gravel, sand and sludge, which can subsequently be collected and reused.
- Consider reuse opportunities for non-hazardous waste sediment, sludges and fines as fill material, gravel road stabilizer, or landfill cover.
- Use waste concrete on-site for construction purposes (e.g. bunker blocks, paving unsealed areas, fill around buildings, parking lot and driveway aggregate). Check with your local permitting agency for roadway requirements.
- Use commercially available delayed set admixtures designed to keep leftover concrete in mix trucks in liquid form to be added to the next batch of mix.
- Consider using safer, less toxic admixtures than chemical additives. Sugar and wood-based admixtures are available.
- Crush waste blocks and bricks to use for groundcover, walkways, tracks, landfill cover, and the remanufacture of other types of block walls, dividers, or curbs.
- Recycle dust into future concrete batches.

**Regulated Non-Hazardous Wastes**

Although not classified federally as a hazardous waste, there are many materials that are stringently regulated in Pinellas County. When in doubt, treat a material as a hazardous waste until you are able to verify that it is not, and then determine what are the correct handling and disposal measures. A common example of this type of non-hazardous waste is used motor oil.

**Hazardous Materials**

Although less stringently regulated than hazardous wastes, the proper storage and handling of hazardous materials is equally important. Many of the storage and handling practices described above for hazardous wastes should, and in some cases must, be applied to hazardous materials as well. This includes certain labeling and spill prevention measures.

- Store on an impermeable (sealed) surface, i.e. resists infiltration or corrosion by the stored materials.
- Store under cover, to protect containers from the elements. Be sure containers are properly sealed.
- Provide secondary containment that will hold up to 110% of the largest container stored in the area. This area should be able to contain any leaks or spills.
- Label containers properly, including contents and date of generation for any hazardous wastes.
- Make sure drums are easily accessible but not stored in high traffic areas where they can be easily knocked over. Regularly check for any signs of leakage, rust, etc.

**P2 Opportunities in Concrete Batch Plant Operations**

There are many opportunities to reduce wastes generated by concrete batch operations. Your facility may already practice pollution prevention without realizing it!
• Ensure that there is sufficient aisle space between drums to allow complete inspection for leaks or damage.
• Check with the local Fire Department for their requirements.

**Transportation and Disposal**

- Hazardous waste must be shipped out by a properly permitted hauler to an EPA-approved treatment, storage, and disposal facility. Check for all the proper local, state, and federal licenses.
- Use reputable permitted companies for transport and disposal. You are forever liable for any hazardous waste that you generate; a “cradle-to-grave” liability. Even if you have proper documentation, you may still be a potentially responsible party to a clean-up if your waste contributes to the contamination of the environment.

**Inspections and Record Keeping**

- Keep all records of hazardous waste handled for at least three (3) years on-site. This includes amounts purchased, stored, reused, and hauled away.
- Keep records of lab tests for at least three (3) years.
- Keep land disposal restriction forms for at least five (5) years.
- Inspect storage containers and areas for leaks or damage at least once per week and maintain a written inspection log on-site for at least three (3) years.
- Keep any training records for at least three (3) years.
- An EPA identification number should be obtained by any facility generating a hazardous waste, unless officially classified as a “Conditionally Exempt Small Quantity Generator.” Contact the address below:

  **Florida Department of Environmental Protection**
  **Southwest District**
  **Hazardous Waste Management**
  **3804 Coconut Palm Dr.**
  **Tampa, FL 33619-8318**
  **(813) 744-6100**

**Mixer Rinse Operations**

- Install shutoff valves to eliminate overfilling truck water tanks
- Install flow control nozzles and smaller diameter hoses on rinse stations
- Limit drivers to 150 gallons or less of rinse water
- Consider metering or using a timer to dispense water for mixer flushing
- Instead of washing out the mixer, use recycling admixtures to stabilize the concrete residues in the drum. Using a maximum of 40-50 gallons of fresh water and the suggested dosage of recycling admixtures will rinse mixer drums. The slurry can be used in the next batch, or the first batch the following day. Studies have shown that these slurries were successfully used in batching operations eight hours, or longer, after adding the recycling admixture.

**Wheel Washes**

- Design wheel washes to account for the maximum extended tire length expected
- Locate wheel washes in an area that provides a sufficient track-out distance before exit from the property
- Minimize off-property track-out by providing a large aggregate or paved roadway immediately after the wheel wash within property boundaries
- Install motion sensors on wheel wash units to provide water only on-demand

**Wastewater**

- Re-use wastewater, wash water and stormwater for concrete batching. Process water in the range of pH 6-9, and 50-200 parts-per-million total suspended solids (TSS) is ideal for re-use in batching, washing and rinsing. Monitor process water pH and TSS to ensure these ranges are met for rinsewater to be re-used for batching. ASTM Specification C-94 permits the use of wash water from mixer washout operations for mixing fresh concrete, as does Portland Cement Association (PCA) (10) standards. Literature indicates that concrete batched from process water strength-tests equal to, or greater than, concrete made using fresh water.
- Maintain containers in good condition. Prevent leaks, ruptures and the accumulation of rainwater on the top of drums.
- If a container leaks, transfer all of the waste to a new container.
- Keep lids on, and containers closed, when not in use.
- Use funnels when pouring liquids.
- Use containers that are compatible with the waste being stored.
- Do not mix different or incompatible wastes in the same container.

**Labels**
Proper labeling can reduce accidents and ensure proper disposal. The example of a label below shows some of the information that should be included.

**Waste Storage Areas**
- Try to store all hazardous wastes in a single area, however do not store incompatible materials beside each other. Satellite collection points are allowed for work-in-progress, but should be moved to the main storage area once the container is filled or not in use.
- Wastes should be stored in a covered area to prevent stormwater runoff and protect the containers from weather exposure.
- Secondary containment should be provided that is able to contain at least 110% of the largest container’s capacity in case of leaks, spills, or punctures. It should have an impermeable (sealed) surface and should be under cover, preferably indoors.
**Corrosive (D002)**

Corrosive wastes are liquids that dissolve metals and other materials, or burn the skin. They have a pH of 2 or lower, or 12.5 or higher.

**Reactive (D003)**

Reactive wastes are unstable and react rapidly or violently to shock, heat, or pressure, or when mixed with water or other materials.

**Toxic (D004)**

Toxic wastes generally have adverse health effects. They need only contain a small amount of a certain material such as heavy metals or toxic organics.

![Corrosive Symbol]

**OR**

2) It is listed as a hazardous waste in the Code of Federal Regulations, 40 CFR Part 261. This list is very long and may include chemicals that you use daily. If you are unsure, it is suggested that you refer to the list cited and have your waste tested by an approved laboratory.

**Handling and Disposal of Hazardous Wastes**

The proper handling of hazardous wastes is critical in assuring the health and safety of the public and protection of the environment. Some important things to remember are:

- Never pour waste fluids on open ground, in storm drains, or down shop drains.
- Never mix hazardous and non-hazardous wastes. Even a little hazardous waste can make the entire mixture hazardous and more expensive to dispose of properly.

- Regularly inspect and provide maintenance of the sediment traps to avoid discharges of contaminated water from the site
- Seal aboveground fuel and chemical additive storage areas with an impervious material and berm to contain spills and leaks
- Test underground storage tanks annually for leaks or necessary repairs

**A Final Consideration...**

One of the easiest and least expensive ways to reduce your wastes is keeping your facility clean. Poor housekeeping results in spills and overflows. This may double your expense by making you pay to replace lost material and also for its treatment and disposal. It can also lead to accidents and worker injury. Here are some tips:

- Sweep site regularly to remove dust buildup
- Clean up all spillages or deposits of materials on ground immediately
- Use dry clean-up methods whenever practical (sweeping, dust collection vacuum, wiping, etc.)
- Instruct staff and drivers to never dump any materials in open areas

**The following Resources Section provides additional assistance on waste reduction in your concrete batch plant operations.**

**RESOURCES**

**Assistance Centers and Information Sources**

**Pinellas County**

Department of Environmental Management,

Pollution Prevention Resource Recovery (P2R2) Program ....(727) 464-4761

Air Quality Division.................................................................(727) 464-4422

Utilities/Solid Waste ..............................................................(727) 464-7500
Wastes Associated With Concrete Batch Plant Operations

The first step toward waste minimization is to identify your waste sources. Sand, aggregate, cement and water are typical raw materials used in concrete batching operations.

During your waste assessment, ask yourself the following:
• What are the wastes created by the materials I use?
• Is there a safer material that will do the same job and reduce wastes?

Air Emissions
As a concrete batch plant operator, you are responsible for controlling unconfined emissions related to batch plant operations. Point source emissions are a result of the transfer of material to silos. Fugitive source emissions include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Particulate matter is a primary pollutant of concern.

Wastewater and Stormwater
Stormwater runoff is another primary pollutant of concern resulting from concrete batch plant operations. Potential wastewater and stormwater pollutants include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

Hazardous Wastes
A waste is considered a hazardous waste if:
1) It has any one or more of the following characteristics:
Ignitable (D001)

Ignitable wastes are easily combustible or flammable. They have a flashpoint of less than 140°F or an alcohol content of 24% or more. (The flashpoint is the lowest temperature at which the vapor of a combustible liquid can be made to ignite in air.)
Preventing pollution has its benefits!

- Reduce facility-wide wastes!
- Save money!
- Protect workers, the public, and the environment!
- Improve your company image!
- Reduce the risk of liability!

Many pollution prevention practices are low-cost and low-risk alternatives to help minimize waste and associated disposal costs.

How do I use this manual?

- Read the information manual and make a commitment to pollution prevention. This commitment should start with the owner and facility operator. Pollution prevention (P2) should be part of your company’s policy.
- Involve all employees. Every employee must be aware of the importance of waste reduction through pollution prevention practices. Their participation and suggestions in your waste reduction program will help to make it a success.
- Evaluate your facility’s wastes to see how much and what kind of waste is being produced. This will make it easier for you to spot areas where pollution prevention tips can be applied.
- Identify potential pollution prevention measures provided in this manual that may help your business.
- Identify new ideas. Trade journals, magazines, employees, vendors, your business trade associations or even inspectors are valuable resources to generate new waste reduction ideas. A “business-as-usual” approach hinders your waste reduction efforts and may not maintain your competitive edge!
- Implement new practices! Evaluate any P2 measures before you put them in place. Consider economic feasibility, productivity effects, and long-term usefulness.
- Re-evaluate your waste reduction opportunities often. New opportunities to reduce wastes arise every day!
- Contact the Pollution Prevention and Resource Recovery Program at (727) 464-4761 for assistance.
profitable, and competitive, while complying with regulatory requirements. As a Pinellas County business, no fees are charged for using the Pollution Prevention Program’s services. On-site waste reduction assistance is available by contacting program staff at (727) 464-4761.

ACKNOWLEDGEMENT

Information support for this document provided by the Florida Department of Environmental Protection’s Pollution Prevention Program and the National Ready Mix Concrete Association (NRMCA) publication, Environmental Management Practices (Pub # 191).

The printing and distribution of this document was funded with Air Pollution Recovery Funds.

Introduction

Stationary and relocatable concrete batching plants are subject to 62-210.300 of the Florida Administrative Code (F.A.C.). Rule 62-296.320(4)(c), F.A.C., requires owners and operators to use reasonable precautions to control unconfined emissions related to batch plant operations. Operations include hoppers, storage and conveying equipment, conveyor drop points, truck loading and unloading, roads, parking areas, stockpiles, and yards. Regulatory requirements can increase operating costs while decreasing a business’ ability to compete. In fact, increased competition demands reducing costs. However, Best Management Practices (BMPs) and new technologies are available that offer facilities an opportunity to comply with the regulations and reduce emissions while saving money and improving efficiency.

What is pollution prevention?

It is the reduction or elimination of pollutants or wastes at the source. The idea behind pollution prevention is to avoid producing the waste in the first place. If the waste is not produced, then you don't have to worry about storage or disposal problems. Having less waste means a better environment for all of us.
About This Manual

This manual is a guide for concrete batch plant owners and operators to assist in establishing waste reduction opportunities. Concrete batch plants, as defined for this manual, include plants that store, measure and transfer concrete constituents into trucks for transport to a job site, plants that use a central mix drum to manufacture concrete on-site for transfer to transport trucks, and plants that pre-cast products on-site such as concrete bricks.

Pollution prevention opportunities presented in this manual may not be practical for all concrete batch plants. Plant owners and operators are encouraged to evaluate waste reduction opportunities based upon their facility’s individual operations. Additional opportunities may exist beyond those identified in this manual. As owners and operators, you have the expertise to identify those opportunities applicable to your operations.

Manuals are developed by the Pollution Prevention and Resource Recovery Section of the Pinellas County Department of Environmental Management, a non-regulatory program that provides waste reduction technical assistance. Program staff provide information on new technologies, process modifications, substitute products, and current industry-specific Best Management Practices (BMPs). Staff can assist businesses in their efforts to become more efficient,
Pinellas County Department of Environmental Management’s Vision

The Department of Environmental Management is dedicated to providing responsible leadership necessary to manage our natural and urban environment to meet the needs of our present and future Pinellas County citizens.
The P2R2 Section’s mission is to minimize the amount of liquid, solid and gaseous pollution as well as energy & water consumption within Pinellas County.

If you are interested in the economic and environmental benefits of reducing wastes in your business, please contact the P2R2 Section at (727) 464-4761.

Pinellas County Department of Environmental Management
512 S. Ft. Harrison Avenue
Clearwater, FL 33756

Printed on Recycled Paper

Pinellas County complies with the Americans with Disabilities Act. To obtain accessible formats of the document, please contact the Department of Environmental Management at:
(727) 464-4761/TDD (727) 464-4106