My grandfather used to show me a trick: He would strike a match and throw it into a pail of gasoline. (I do not suggest that anyone attempt this “trick.”) Because the oxygen supply was so quickly diminished, nothing happened except for the match going out.

Does that mean gasoline is “safe”? Not by a long shot.

We can also make some comparisons with concrete form release agents. Safety rules, both from an employee and environmental perspective, must be observed carefully to ensure we are not dealing with materials that are harmful, or potentially harmful, to our employees and environment.

Employee safety

It is very important that all employees are familiar with Material Safety Data Sheets (MSDSs) and in particular the Hazardous Material Identification System (HMIS) ratings shown on the MSDSs. The HMIS ratings shown on the MSDSs are also a quick reference for employees. Four categories are shown:

- Red (fire)
- Blue (health)
- Yellow (reactivity)
- White (personal protection)

The ratings for fire, health and reactivity are set by the National Fire Protection Association (NFPA) using the numbers “0” to “4” with “0” being the lowest potential hazard/problem and “4” being the highest potential. Personal protection is rated as “A” through “K” and “X.” All employees should be aware of how to read the HMIS labels on containers and also be aware of the differences in the ratings. Safe handling of the material and proper safety equipment are extremely important. Your employees should be educated with this information to enhance personal, plant and environmental safety.

While all the ratings are important, the one often overlooked in concrete form release agents is the “Red (fire)” classification. This classification falls under the DOT regulations shown below.

Required labeling of containers

The question of labeling concrete release agent containers during transport and placards required during transportation often arises among precasters and concrete pipe producers.

Container labeling for safety purposes in the plant is extremely important, but first we have to get the material to the plant. This can be done by a commercial carrier or often via a customer-owned truck. If the material is “combustible” or “flammable,” a “Hazardous Materials 126 Certified” driver is necessary no matter how much material is being transported. In the same vein, a Commercial Drivers License (CDL) is needed only if the Gross Vehicle Weight (GVW) of the truck exceeds 26,000 lbs (11.8 tonnes).

Definitions

- Hazardous materials: Products that pose a risk to health, safety and property during transportation. The term is often shortened to HAZMAT, or to HM. Hazardous materials include explosives, various types of gas, solids, flammable and combustible liquids and other materials.
- Flammable (Red Label “3”): Any material that has a flash point of 140°F or less (closed cup)
- Combustible (Red Label “2”): Any material that has a flash point of between 141°F and 200°F (closed cup)

Materials having a flash point in excess of 200°F (no Red Label Required as being NFPA rated as “1” or “0”) are DOT-exempt. These materials are not DOT regulated and do not require the truck to be identified with “hazardous materials” placards nor do they require the driver to be HazMat 126 Certified.

As required by law, all flammable and combustible material containers must have a “Red Label” on each container. The exception to this is if there are multiple “small” containers in a package, then the outside package must have the “Red Label.”

Shipping via commercial or company-owned trucks

Hazardous material placards are not required on the truck if the amount of flammable or combustible material being carried does not exceed 1,000 lbs (0.45 tonnes). If there are more than 1,000 lbs of a combustible or flammable material being carried, appropriate placards must be shown. However, any amount of hazardous materials being transported requires that the driver be HazMat 126 certified.

Labeling of containers

Further, any size container with a flammable or combustible material must have a “Red Label” with the number “2” for combustible and the number “3” for flammable. The exception...
Environmental safety

The vast majority of concrete form release agents use a petroleum solvent as the carrying agent. In reactive form release agents, the amount of reactive material added is relatively small – usually less than 10%. While the reactive portion is usually biodegradable ("environmentally friendly" or "readily biodegradable"), the carrying agents are normally less so.

The first assumption is to question why the material is being introduced to the environment instead of being applied to the concrete forms. Over-application of form release agents is very common in the precast industry and eventually some of this overspray ends up on the floor, ultimately washes off and contaminates the outside ground. Water run-off analyses will determine if you are contaminating the environment and perhaps ground and sub-surface water. While over-application is a waste of money and encourages bug holes and staining, we need to also educate our workers that “thinner is better” to help avoid ground contamination, reduce our costs (no matter how little) and have better-looking castings.

A second area of concern regarding the environment is Volatile Organic Compounds (VOCs) in form release agents. Federal Regulations for allowable levels of VOCs have been in effect since September 1999. Since then, individual states have enacted legislation reducing the allowable levels of VOCs from the federal level of 450 g/L to a maximum of 250 g/L.

California was the first state to institute lower VOCs (2001), followed by the New England area for those states that were members of the Ozone Transmission Committee. Canada recently published its regulations for allowable VOCs in form release agents, which will go into effect in 2012. The map shows the levels of VOCs allowed for the various U.S. states and Canada. It is important to the precaster that the material used does not exceed the allowable levels for the particular area. We can expect the U.S. Environmental Protection Agency to reduce the allowable VOC levels as a federal mandate, based on the changes that have been legislated in the individual states.

As local, state and provincial regulations are sometimes more stringent than federal regulations, you should check with your local authorities as to what requirements are in place for your area.

Potable (drinking) water

If you are producing castings that will be exposed to potable (drinking) water, a form release should meet the American National Standards Institute (ANSI) 61 requirements. The intent is to establish standards and certify that the end product exposures are acceptable for human consumption. Very few concrete form release agents are ANSI 61 approved due to stringent tests that are conducted on the product. The tests include plant and quality certification, along with tests on the form release. It is not an inexpensive procedure, and recertiﬁcation is handled on an annual basis.

The testing of the form release agent assures that the castings ultimately exposed to potable water will have no contamination harmful to animal life. Although the ANSI 61 approval is often granted based on “mix design” (which includes the form release being used), it is more acceptable to have a form release that is already approved for this application. Certification for the ANSI 61 standards are approved by the organizations such as the National Sanitation Foundation (NSF), Water Quality Association (WQA), Underwriters Laboratory (UL) and others who are authorized to grant this certification.

Bob Waterloo is technical sales manager, Concrete Release Agents, Hill and Griffith Co., based in Indianapolis. For additional information, contact him at bwaterloo@hillandgriffith.com or visit the Hill and Griffith website at www.grifcote.com.

REFERENCES

The information presented in this article is presumed to be correct based on the sources referenced below. In all cases, check local and state regulations. Hill & Griffith does not accept any responsibility and provides this information as a service to the industry.

- “Emergency Response Handbook,” developed by the U.S. Department of Transportation (DOT), Transport Canada (TC), and the Secretariat of Transport and Communication of Mexico (SCT)
- National Sanitation Foundation (www.NSF.com)
- Water Quality Association (www.wqa.org)